

# Computer Concepts CORPORATION

Here it is! A complimentary copy of PC2200 version 2, the terminal emulation software that has received such favorable reviews. If you missed the reviews, PC2200 is a software package that allows any PC, XT, AT or 386 compatible to function as a WANG 2200 terminal. If your system has a Hercules Graphics Plus (RamFont) monochrome or EGA/VGA color monitor then this version 2 of PC2200 will exactly emulate the 2200 character set including true box graphics.

PC2200, however, does far more than just emulate a WANG 2200 terminal. File transfer, print spooling, disk-to-keyboard, keyboard-to-disk, TSR Pop-Up and shell-out are just a few of the functions that can be called at a moment's notice. And for the programmer, we've included a whole new set of HEX(02...) terminal control sequences that give you access to the powers of the PC using WANG 2200 BASIC or Niakwa/Bluebird SuperDos BASIC2C. You can use COLOR, import/export data or even print to the 25th line.

Unlike many other emulation packages, ours is 'interrupt-driven.' This, coupled with the fact that we wrote our software in an efficient low-level language, gives us the ability to drive a PC error-free at 19200 baud and AT class machines at 38400 baud. If you are currently able to transfer files at only 9600 or 4800 baud, the use of PC2200 could dramatically improve your throughput times.

To prove that PC2200 is all that we say, we've included a LIMITED USE copy of PC2200 (along with temporary documentation) for you to examine. Afterwards, if you decide that you want to keep PC2200, then give us a call. We'll send you a formal manual and unlock your LIMITED USE diskette for only \$295.

To get started, perform the following steps.

1. Carefully read the enclosed license agreement. If you agree to this license, proceed to step 2.
2. Open the enclosed envelope. You should find the PC2200 distribution diskette. If you received the 5.25 inch package, you will have a second diskette labelled MANUAL. The temporary manual can be printed on your PC printer by inserting the PC2200 diskette (or MANUAL diskette) and entering the following command at the DOS prompt.

```
TYPE A:MANUAL>PRN
```

3. Attach your PC's serial port to the 2200 MUX controller using standard WANG cabling. For test purposes, you may find it easier to just remove the cable from your WANG terminal and plug it into the PC. Be aware that PC serial ports are male connectors and standard WANG terminal cables are also male. Therefore, you may need a RS-232 'gender changer', available at most computer stores for only a few dollars. Or, call us, and we can make one available to you.
4. Read the section from the manual entitled 'Getting Started', and start up PC2200. To exit back to DOS, press CTRL-Z.

The LIMITED USE diskette is only good for six runs, so if you have any problems getting started, be sure to give us a call. Our support staff will be happy to assist you in your efforts.

TELEX: 362215  
ANBK: COMPCONCEPT UD

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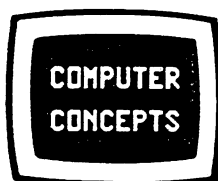
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**Computer Concepts**  
CORPORATION

**Version 2**

**PC2200**  
**Wang 2200 Terminal Emulation**



**PC2200**

**Wang 2200 Terminal  
Emulation**

**Version 2**

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***by***

***Computer Concepts Corporation***

***Lenexa, KS 66214***

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**SECOND EDITION**

**First Printing - April, 1989**

*[The text on this page is extremely faint and illegible. It appears to be a list or a series of entries, possibly containing names and dates, but the characters are too light to transcribe accurately.]*

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# 1 INTRODUCTION

---

The PC2200 program allows an operator to use a commonly available PC type personal computer as a terminal to a Wang 2200 or SuperDos system. The program performs the functions of Wang terminals, but it has several additional capabilities. These include file transfer, color, custom fonts, record-playback scripts, and access to other DOS commands, and a Martians game with color special effects as a demonstration. (@MRTIAN.SRC © Wang Laboratories<sup>1</sup> 1985, 1986.) The required hardware and features of the program are detailed in the remainder of Section 1.

If you find you need assistance with PC2200, call either the vendor you purchased the product from, or Computer Concepts Corporation @ (913) 541-0900. Support is available from 8AM to 5PM (Central Time), Monday through Friday.

The first-time user should immediately read "GETTING STARTED," Section 2, which explains how to get the program quickly in operation and how to install on a hard disk or working copy. Distribution disk contents are also discussed. Some topics in Section 3 will be of interest if terminal setup and operation need to be changed. The sample sessions in Section 6 show actual usage of the program in different situations.

More experienced users will value the ability to change colors, fonts, and features discussed in Section 3. Functions having to do with the PC or PC file transfer are detailed in Section 4. The most advanced features for Wang programmers are found in Section 5. System details may also be found in the Appendices.

---

<sup>1</sup> Wang is a registered trademark of Wang Laboratories, Inc. IBM is a registered trademark of International Business Machines Corporation. MS-DOS and DOS are registered trademarks of Microsoft Corporation.

This version has significant new features not found in older versions. Menus offer changes to many of the terminal's features. Boxes may be drawn with lines directly under the characters rather than the next line. Wang character fonts, various language fonts, or custom fonts are reproduced on displays with font capability. The record-playback feature is new. Printer and display output may be selectively translated or modified.

## **1.1            SYSTEM REQUIREMENTS**

---

To operate the system requires an IBM PC or compatible type of computer with a minimum of 256K internal memory, an unused serial port, one floppy drive, DOS version 2.0 or higher, and a Wang 2200 with enough memory for another partition and empty terminal slot on a MUX-D or MUX-E controller. To use some features (such as character fonts) an EGA, VGA, or Hercules Graphics + (RamFont) graphic controller card is also required.

The PC should be connected to the Wang 2200 using a standard Wang terminal cable and a gender changer. The gender changer should be used at the back of the PC because both the serial port and the Wang terminal cable are male plugs.

## **1.2            FEATURES**

---

- \* PC2200 runs on a PC type computer with a color or monochrome monitor. Additional features are available if the PC uses an EGA or VGA type display or Hercules Graphics + (RamFont) mono video controller.
- \* PC2200 is compatible with all Wang 2236, 2336, 2436, and 2536 terminal models.

- \* Communication (BAUD) rates available are: 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400. 38400 Baud is not available on PC or XT and is not guaranteed.
- \* Parity may be Odd or None (10 bit word).
- \* Box Graphics are supported in the character mode. The horizontal elements of the boxes are displaced one-half line if the PC character set is used (/ASC). This is the NIAKWA BASIC2C standard. If Wang character fonts are available and enabled (no /ASC switch), then horizontal box elements are drawn directly under text, as in Wang terminals. Wang character fonts are available on EGA, VGA, and Hercules Graphics + (RamFont) video controllers.
- \* Inverse video display available with light background and dark characters on color displays with CGA, EGA, or VGA display adapters.
- \* A high speed file transfer utility is available which allows transferral of binary files, either as diskimages or as 2200 files. Data may be sent to-and-from the PC machine. This allows software vendors to quickly manipulate files between NIAKWA BASIC2C and Wang BASIC2.
- \* Color and screen control sequences have been added which are in the familiar HEX(0200xyy0F) format used in Wang BASIC2.
- \* Printer output may be directed to a file on the PC or to a selected printer port. This includes screen dumps.
- \* ASCII text may be transferred from a DOS file to a Wang 2200 application program awaiting keyboard entry. Transfer may be halted, and scripts may be captured using the "Record-Playback" features.
- \* The 25th line of the PC monitor is available for use by Wang 2200 application programs.
- \* The INPUT SCREEN function is emulated when the Wang contains a 2236MXE controller and version 2.4 or higher of BASIC2 language.

- \* Assignments of special keys may be changed, character sets may be changed, and custom characters may be created.
- \* **SAVE** and **RESTORE SCREEN** commands allow for quick manipulation of the screen for use with help screens or window overlays.
- \* **PC2200** will stay resident while other DOS programs are run. A command processor may be entered, allowing DOS commands. The **EXIT** command will return to terminal emulation with the full Wang 2200 application screen restored. Alternatively, the "Resident" parameter (/R) allows terminal emulation to be available at any time (even during other DOS programs) by striking a hot key sequence [**ALT+W**].
- \* The security system allows installation of one additional copy, either on a hard disk or on a floppy diskette. Economical site licensing and network versions allow many simultaneous users.
- \* If the DOS version is 3.0 or above, the program may be started from a different disk or directory than the current disk and directory. The disk name may be specified on the command line, or the disk and directory may be placed in the "path" statement. All font, keyboard mapping, and help files as well as the security fingerprint may reside on the disk and directory from which the program is started.
- \* **Differences from previous versions:**
  - Will stay resident in memory; request with "hot key."
  - Multiple language support.
  - True Wang character set, including greater compatibility in box outlines.
  - Inverse video.
  - User definable custom fonts.
  - Color palette control on EGA and VGA display systems.
  - Help screen for command line switches.

- Setup menu to change terminal operation settings.
- Printer code translation table allows Wang or PC ASCII printers.
- Printer filters may be controlled.
- Built in assignment tables for compatibility with NIAKWA, Wang 720 Series keyboards, as well as original PC2200 assignments.
- Support for Enhanced Keyboard -- F11, F12, and ALT combinations -- is provided.

## 1.3

## NOTATIONAL CONVENTIONS

---

Whenever

### **[ENTER]**

appears at the end of a line in this manual, press the ENTER key (sometimes called the RETURN key) after typing the line shown.

Whenever symbols like

### **[CTRL+X]**

appear, press and hold the control key, and press and release the "X" key (or whatever letter is in the symbol). The control key is usually labeled "Ctrl" on PC type keyboards.

Whenever symbols like

### **[ALT+S]**

appear, press and hold the "ALT" key, and press and release the named letter key. (Just like shift or control, but use ALT).



The word

## **filespec**

indicates a file specification and is used to indicate the location and name of a file. A "filespec" may include disk, directory path, file name, and extension parts in the form:

**[d:][path...\]filename[.ext]**

The parts shown in brackets, [...], are optional. (Don't type the brackets.) If optional parts of the filespec are not used, the current disk and path is assumed. If a disk must be specified, then type the name of the disk in place of '[d:]'. An example is 'C:'. If a directory path is needed, type a directory path in place of '[path...\]'. The filename may be up to eight letters long. Some filenames require the period and file extension '.ext'. The extension may have at most three letters.

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## **2 GETTING STARTED**

---

This section will detail how to begin the terminal emulation, what files come with the program, and how to put the program onto a hard disk or backup copy.

### **2.1 TRY IT OUT!**

---

For the operator to use the PC2200 Wang Terminal Emulation program, the PC must be connected to a Wang 2200. Connect a standard Wang terminal cable with a "Gender Changer" to the PC. Connect to the number 1 port. (If this is not possible, the COM2 port may be used with a command line switch.)

**NOTE:** The gender changer allows cable terminated with a male RS-232 plug to be connected to a male RS-232 plug on the back of the PC. Do NOT connect to a female connector on the back of the PC; it is probably a printer connection, not a serial line.

The terminal emulation is pre-set to a communication ("BAUD") rate of 19200, and the "parity" is "odd." If the Wang 2200 connection must have different settings, or a different serial communication port must be used on the PC, consult Section 3.1. Most of these settings may be changed from the Setup menu, also described in Section 3.1.

The PC2200 diskette may be used directly. Place the diskette into drive A, and type the following:

**A: [ENTER]**

**PC2200 [ENTER]**

**NOTE:** Whenever the symbol [ENTER] appears in this manual, press the ENTER key after typing the line shown.

Notice that a title screen appears first. The screen shows the program disk serial number, copyright notice, version number, and some information about the program.

Now press any key to start normal operation.

**NOTE:** Several special keys on the Wang 2200 keyboard are not on the PC. However, simple key substitutions or combinations replace those keys. For instance, the RESET key function is replaced by the combination [CTRL+R]. When a symbol like [CTRL+R] occurs, press the CONTROL key, and hold it while striking the "R" key. Some PC keyboards abbreviate CONTROL as "Ctrl."

**Some useful key functions are:**

- Reset ..... [CTRL+R]
- Erase (line) ..... [SHIFT-RIGHT-BRACKET], "]"
- Clear ..... [ALT+C]
- Load ..... [CTRL+HOME]
- Run ..... [HOME]
- Halt/Step ..... [CTRL+S]
- Continue ..... [CTRL+C]
- Edit ..... [END]
  
- Help (about PC2200) ..... [ALT+H]
- Exit (PC2200 program) .... [CTRL+Z]
- Temporary eXit to DOS ... [CTRL+X]
- Setup menu ..... [ALT+S]
- Keyboard file transfer ..... [CTRL+K]

A complete list of key substitutions is given in APPENDIX A.

A file called "READ.ME" will be found on the distribution diskette. This file contains any up-to-date information about PC2200 which may be missing from this manual. Insert the PC2200 diskette in A, and type the following command to view this file:

**TYPE A:READ.ME**

## 2.2 DISK CONTENTS

---

The Wang PC2200 Terminal Emulation program disk contains the following files:

- READ.ME** ..... Latest information about PC2200
- PC2200.EXE** ..... Wang 2200 Terminal Emulation Program
- PC2200.HLP** ..... [ALT+H] Help screen, user may customize
- PC22MNTN.EXE** ..... Maintenance Utility: Keys, Fonts and Translation tables
- PC2200FT.SRC** ..... File Transfer Program, part 1
- PC2200F1.SRC** ..... File Transfer Program, part 2
- PCB2CFT.SRC** ..... File Transfer, for NIAKWA's BASIC2C, part 1
- PCB2CF1.SRC** ..... File Transfer, for NIAKWA's BASIC2C, part 2
- HDCOPY.EXE** ..... Transfers security fingerprint to hard or floppy disk
- COLOR.SRC** ..... Demonstration program
- BARGRAPH.SRC** ..... Demonstration program
- @MRTIAN.SRC** ..... Game, color special effects.

## 2.3 **INSTALLING ON A HARD DISK OR FLOPPY**

---

An operating copy of the distribution diskette should be made, rather than using the original diskette. This section details how to install the program onto a hard disk and how to create an operating copy of the distribution diskette.

The PC2200 program is distributed on a diskette with a built-in security system. For convenient use, one copy may be installed on a hard disk or onto a second floppy diskette which will not require the use of the original distribution diskette.

**NOTE:** The installation process copies a "security fingerprint" from the master distribution diskette onto a hard disk or second floppy diskette. PC2200 is inoperable unless the "security fingerprint" can be found on either the diskette drive or the hard disk.

To install PC2200, insert the PC2200 diskette into drive A:, and type the following commands:

**A:** **[ENTER]**

**HDCOPY D:** **[ENTER]**

**COPY A:PC22\*.\* d:\pathname** **[ENTER]**

For 'd:', type the name of the destination hard or floppy drive, usually 'C:', and for '\pathname' use the directory path where executable programs are kept. Many users have set up a path called '\BIN' for commonly used programs on a hard drive.

For example, to install PC2200 in the directory \BIN on drive C, type:

**A:** [ENTER]

**HDCOPY C:** [ENTER]

**COPY A:PC22\*. \* C:\BIN** [ENTER]

**NOTE:** The system allows only one hard disk or additional floppy diskette to contain the "security fingerprint" at any one time. The DOS backup, restore, or copy utilities do not store the "fingerprint." If the necessity to re-format the disk containing PC2200 occurs, the "fingerprint" must first be recovered from the hard disk. Otherwise the "fingerprint" will be lost, and the program may only be used from the distribution diskette.

To recover the "fingerprint," place the PC2200 diskette in drive A: and type the following:

**A:** [ENTER]

**HDCOPY d: /U** [ENTER]

For 'd:' use the hard drive name (usually 'C:') on which the program was installed.

After the re-format operation has finished, the "security fingerprint" may be installed back on the hard disk.

**NOTE:** If the fingerprint on the hard disk is accidentally destroyed, fill out the Product Replacement Form at the end of this manual and mail it to Computer Concepts. Until a new fingerprint diskette arrives, the PC2200 program may be started from the original distribution diskette.



## **3                    CHANGING PROGRAM                          OPERATION**

---

This section describes the use of the Setup menu and command line switches to make changes in program operation. Changes to the position of keys and character fonts may be made with a maintenance program, also described in this section.

### **3.1                    SETUP MENU, COMMAND                          LINE SWITCHES**

---

Adjustments to terminal operation may be made by changing the program "setup." Options include data rate, parity, language set, Wang or PC character set, selection of keyboard layout (mapping), and printer and keyboard transfer translations. Most adjustments may be made during program operation by using the "Setup" menu, or -- at the time the program is started -- by using options switches on the PC2200 command line.

#### **3.1.1                Setup Menu**

Hold "ALT" and press and release the "S" key, [ALT+S], to activate the Terminal Setup Menu. This menu has screens with several terminal functions on each screen, as shown in figure 1. The current setting of each item in the menu is indicated by a square box (□). A dash (-) indicates other options.

Computer Concepts Corporation model B-1221L by COMPUTER CONCEPTS  
Ready Computer Concepts P 07

:

PC2200 Terminal Setup Menu		Page 1 of 2	
<b>Baud Rate</b>	<b>Language Set (/L0-18)</b>	<b>Screen Display</b>	
- 38400	- Azerty French	- Norwegian	■ Normal
■ 19200	- Canadian	- Spanish	- Inverse (/I)
- 9600	- Cyrillic/Latin	- Spanish/Latin	
- 4800	- Danish	- Swedish	
- 2400	- Finnish	- Swiss French	<b>Character Set</b>
- 1200	- Flemish	- Swiss German	■ PC ASCII (/ASC)
- 600	- German	- United Kingdom	- Wang Z200
- 300	- Icelandic	■ United States	
- 150	- Katakana	- User Defined	
	- Netherlands		<b>Keyboard Mapping</b>
			(/KB-3)
<b>Parity</b>	<b>NEXT PAGE - PgDn</b>		- Wang 720 series
- None (/N)	SPACE - Select Item		■ PC2200 Default
■ Odd	RETURN - Next Field		- Mikum Default
	ESC - Proceed		- User Defined

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:

PC2200 Terminal Setup Menu		Page 2 of 2
<b>Printer (/Z04) Parameters:</b>		
1. Insert Line Feed (0A) after each Carriage Return (0D)?		
- No (/NL)		
■ Yes		
2. Filter End Of File character (1A) from DOS filespecs?		
- No (/NF)		
■ Yes		
3. Translate Wang Z200 to PC ASCII?		
■ No		
- Yes (/FX)		
<b>Keyboard File Transfer:</b>		
4. Translate PC ASCII to Wang Z200?		
■ No		
- Yes (/FX)		
	<b>PREV PAGE - PgUp</b>	
	SPACE - Select Item	
	RETURN - Next Field	
	ESC - Proceed	

Figure 1 - Terminal Setup Menu

To view the next screen of the menu, press the page down key, **[PgDn]**. To return to a previous screen, press the page up key, **[PgUp]**.

The terminal function to be changed (Baud Rate, Parity, Language Set, etc.) must be selected. The selected function is indicated by the presence of a flashing box within the option list of the function. Press the **[ENTER]** key to move the flashing box from function to function, or touch the first letter of the function to change.

Change the current setting of the selected function to a different option by pressing the space, backspace, up arrow (North), or down arrow (South) key. The space and down arrow keys will cycle to the next option in the list. The backspace or up arrow keys will change to the previous option in the list. Repeat the space or backspace keys until the box flashes by the required setting.

When all changes are complete, press **[ESC]** to continue with normal terminal operation.

### **3.1.2 Command Line Option Switches**

The list of command line option switches is given in figure 2. This list may be obtained by typing:

**PC2200 /H**

**[ENTER]**

```

H:\CCC>pc2200 /h
Usage: pc2200 [/options]
/nmmnn Set baud rate to mmmn           /Kd   Keyboard mapping d=
/Abfup Color Attributes where          0-Wang 720 series
      b=background (0-7) u=underscore (0-7) 1-PC2200(*)
      f=foreground (0-7) p=perimeter (0-F) 2-Miakua
      see color values listed below        3-User defined
/ASC   force ASCII character set mode    /Ld   Language set select
/Bd    Box mode select where d=          where d=0-18
      0-no boxes      3-double horiz(*)   /N    No parity
      1-single lines  4-double vertical   /NL   No Linefeed
      2-double lines                                     /NF   No Filter - will not
/ Cd   Comm port where d=1(*) or 2      filter 1A from LPT
/E(p)h Enhanced palette colors where    filespecs
      p=palette number (0-F) (0=default) /Pd   Printer # where
      l=low intensity rgb (0-7)          d=1(*) to 3
      h=high intensity rgb (0-7)        /PL filespec - PLay filespec
      0-black      3-cyan      6-brown  in batch mode
      1-blue       4-red       7-white  Printer Xlat - xlate
      2-green      5-magenta                                     LPT 2200 to ASCII
/PX    Translate KFT ASCII to 2200      /R    Resident mode
/I     Inverse video mode select        /S    Small model
The switches are optional, may be used in any order and either upper or lower
case. The * indicates the value PC2200 will use in the absence of a switch.
H:\CCC>

```

Figure 2 - Command Line Help Screen

Each desired switch may be placed on the command line after the "PC2200" command. If no switch is given, the default setting is used. Switches may be given in any order. For example, to start PC2200 at 1200 baud using the serial port #2, type:

**PC2200 /1200 /C2 [ENTER]**

To use parallel printer port #2 and set the colors with foreground=red, background=black, perimeter=pink, and underline=blue, type:

**PC2200 /A041C /P2 [ENTER]**

### 3.1.3 Options

Each command line switch is shown. The default setting is indicated with a "\*". If the parameter can be changed from the Setup Menu (accessed by the [ALT+S] key), the symbol  precedes the command line switch.

**/nnnnn** Set communication BAUD rate to nnnnn. Possible values are /150, /300, /600, /1200, /2400, /4800, /9600, /19200, and /38400.

**/Abfup** Set default color codes for characters. (Ignored on monochrome monitors.) With EGA or VGA type displays, the color code entered here is translated by the "palette", as described below. The colors are fixed on the CGA type of monitor. Unless the "palette" is changed, the color shown here will appear.

b=Background color behind ch. (0-7) (\*blue=1)  
f=Foreground color of ch. (0-7) (\*white=7)  
u=Underline color (0-7) (\*green=2)  
p=Perimeter border color (0-7) (\*blue=1)

#### Default colors for color codes:

0=black 4=red 8=gray C=pink  
1=blue 5=purple 9=lt. blue D=lavender  
2=green 6=brown A=lt. green E=yellow  
3=cyan 7=white B=lt. cyan F=brt. white

Not all four color selections are required. For example, to set background=black, foreground=red, and defaults for underline and perimeter colors, use the switch "/A04"

☐ **/ASC** Force use of PC ASCII character mode, rather than Wang 2200 character set (\* default to Wang character set, unless hardware does not support fonts).

**/Bd** Box mode select where d=  
0-no boxes                    1-single lines  
2-double lines                3-double horiz(\*)  
4-double vertical

**/Cd** COM serial port number, where d=1(\*) or 2

**/E[Pd]lh...**

Enhanced palette colors. This determines the actual color for a given color code (the palette).

P and the starting color code d (0-F) starts palette color code at d. (\* default for d is color code 0.) Follow with 'lh' color numbers. Additional 'lh' values may be entered (without an intervening 'P') for successive palette numbers, and Pd may be entered again to start another palette color code.

These 'l' (low energy) and 'h' (high energy) color values combine to form a displayed color:

0-black    1-blue        2-green        3-cyan  
4-red        5-magenta    6-brown        7-white

See Section 5.1.10, Color Control, for more information on specifying palette colors.

Example: '/EP112P5440747'. Code 1 (default background) is green but slightly blue. Code 5 (Wang mode intensified) is very bright red. Palette code 6 is normal white. Code 7 (default foreground) is white with a little red to form light pink.

- /FX** Keyboard File Xlate. Translate files from ASCII to Wang 2200 during Keyboard File Transfers. (\* no translation default.)
- /I** Inverse video mode select
- /Kd** Keyboard mapping where d=
 

0-Wang 720 series	1-PC2200(*)
2-NIAKWA	3-User defined
- /Ld** Language set select where d=0-18. Languages are:
 

0 - Azerty French	1 - Canadian	
2 - Cyrillic/Latin	3 - Danish	4 - Finnish
5 - Flemish	6 - German	7 - Icelandic
8 - Katakana	9 - Netherlands	
10 - Norwegian	11 - Spanish	
12 - Spanish/Latin	13 - Swedish	
14 - Swiss French	15 - Swiss German	
16 - United Kingdom	17(*) - United States	
18 - User Defined		
- /N** No parity (\* odd parity if omitted)
- /NL** No Linefeed (\* print line feed if omitted)
- /NF** No Filter - will not filter hex 1A character from LPT file output

**/Pd** Printer # where d=1(\*) to 3

(NOTE: [ALT+P] Printer Menu also changes /Pd)

**/PLfilespec**

Immediately play the specified ".PLY" file; 'filespec' may be any valid dos file name including disk and path.

- /PX** Printer Xlate - translate  
Printer Wang 2200 to ASCII. Use this switch if a PC ASCII printer is used or if printer re-direction is to capture files in PC ASCII format.

- /R** Resident mode. This allows the program to be activated during other DOS programs by striking **[ALT+W]**. Use **[CTRL+X]** to return to DOS from PC2200. (\*Default is non-resident mode: **[CTRL+X]** allows DOS commands, but the user may return to PC2200 only with the EXIT command.)
  
- /S** Small model. This uses less memory, but only one user save screen is available, rather than 3. About 8K of memory is saved, which may be important if other programs are to be used simultaneously and memory is limited.



## 3.2 PRINTER OUTPUT SELECTION

Wang 2200 programs may direct output to a local printer connected to the terminal (or terminal emulation program). The **[PrtSc]** key may also be used to print the screen's contents on the printer.

The location of printer output may be selected by the operator. As many as three printer connections on a PC may be used, or the print output may be directed to a file on the PC. If the "printer" output is placed on a PC file, it may be printed at a later time. The process of selecting the printer output location is known as "printer re-direction."

Press **[CTRL+P]** to direct the printer to a different location. The menu screen in figure 3 will appear.

```
PRINT DOCUMENT
ENTER ITEM NUMBER / 0=DONE
-

1) DOCUMENT NAME:                cf  12) PRINT EDITED PAGES ONLY?      NO
2) FIRST PAGE TO PRINT:           1  13) DOUBLE SPACING?              NO
3) LAST PAGE TO PRINT:            1  14) PRINT NOTES?                 NO
4) LEFT MARGIN:                   8  15) PRINT LINE NUMBERS?         NO
5) PRI
6) PIT You have selected the PRINTER channel re-direction feature.
7) COM1 NO
8) PAP The channel is currently directed to parallel port P1.
9) NUM
10) PRI
11) HYP You may direct the printer channel to any PC filespec or
the parallel ports 'P1', 'P2' or 'P3'. (note: the parallel
port designator bypasses DOS and yields better performance
than the DOS device names 'PRN' or 'COM1'.)

Enter the printer channel target
_____
```

Figure 3 - Printer Output Selection

Enter the name of the desired printer, "p1", "p2", or "p3", for the

first, second, or third printer connected to the PC. The name of a file may also be entered at this time, and the printer output will accumulate in the named file. A reserved DOS device name (such as COM1, or COM2) may also be used. A complete filespec in the form:

**C:\path...\FILENAME.EXT**

may be entered. See Section 1.3 for an explanation of filespecs.

If a print filespec is given, and the file already exists, a message will appear asking whether to delete the existing file or to append to the end of the file. Enter 0 to delete or 1 to append, and press **[ENTER]**.

The name P1, P2, or P3 for printer 1, 2, or 3 gives better performance than the DOS device driver LPT1 or PRN because the output goes directly to the printer port without using DOS.

Sample sessions for usage of printer selection are found in Section 6.

## **3.3 KEYS, FONTS MAINTENANCE PROGRAM**

---

### **3.3.1 What It Is**

The character set of the Wang differs from that of the PC. A special character set is used in PC2200 to give a normal Wang terminal appearance when the PC's display hardware is capable of using a custom character set. (EGA, VGA, and Hercules + (RamFont) display adapter cards are compatible.) If the display hardware cannot use custom character sets, or they are disabled, then the Wang characters (Wang 2200 code) are translated to the closest PC (ASCII) characters. This section describes how to change the VIDEO table which assigns the PC's characters to the Wang's character codes. This section also describes how to alter the appearance of the Wang characters and even create custom characters called FONTS.

Several keys on the Wang 2200 keyboard do not directly appear on the PC keyboard, and several keys on the PC do not appear on the Wang. The PC2200 program assigns the Wang's key functions to positions on the PC keyboard as logically as possible. However, the user may wish to change these assignments of key functions. This section describes how to change the key assignments - called the KEYBOARD table.

### **3.3.2 How It Works**

The program PC22MNTN will create new tables or update the existing tables which tell the PC2200 terminal program how to translate the keyboard and characters and the custom character fonts. This program creates a file (PC22TABL.DAT) containing the

new tables. If this file is present in the current directory or the directory where the PC2200.EXE program resides when it is started, then the new tables will be used.

To modify these "VIDEO", "KEYBOARD", or "FONT" tables, change to the directory or disk containing the PC2200 programs. Then type the following:

**PC22MNTN                    [ENTER]**

If the tables file is not present, the program will ask if a new table is to be built. Respond with a 0 for NO or 1 for Yes, followed by [ENTER].

Figure 4 shows the MAIN MENU of the maintenance program. Type the appropriate number from the menu, and press [ENTER].

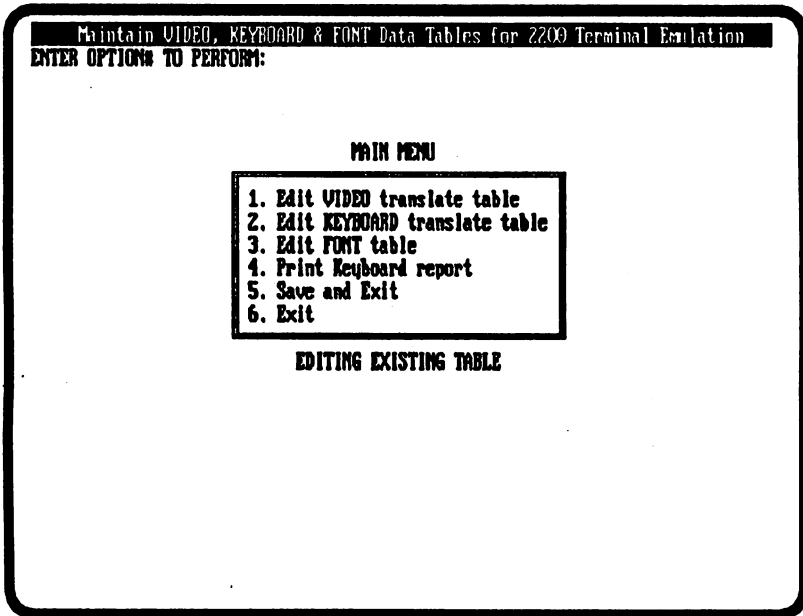


Figure 4 - Maintenance Program, MAIN MENU

The actions to edit a table type, or the function of the menu option, will be described.

**Option 1, Edit VIDEO translate table:** The table below (figure 5) is the current assignment of PC characters to each Wang 2200 code. The hexadecimal code number can be seen from the row and column headings.

Maintain VIDEO Translate table for 2200 Terminal Emulation

WANG CHARACTER SET																PC CHARACTER SET																																																					
		0 1 2 3 4 5 6 7 8 9 A B C D E F																0 1 2 3 4 5 6 7 8 9 A B C D E F																																																			
		NON DISPLAYABLE																																																																			
0x																		0x		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F																																		
1x		á	é	í	ó	ü	ä	ë	ï	ö	ù	à	è	ì	ò	û	ä	ë	ï	ö	ù	1x		4	5	6	7	8	9	A	B	C	D	E	F																																		
2x		!	"	#	\$	%	&	'	(	)	*	+	,	-	.	/	2x		!	"	#	\$	%	&	'	(	)	*	+	,	-	.	/																																				
3x		0	1	2	3	4	5	6	7	8	9	:	<	=	>	?	3x		0	1	2	3	4	5	6	7	8	9	:	<	=	>	?																																				
4x		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	4x		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O																																				
5x		P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_	`	{		}	5x		P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_	`	{		}																										
6x		a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	6x		a	b	c	d	e	f	g	h	i	j	k	l	m	n	o																																				
7x		p	q	r	s	t	u	v	w	x	y	z	~									7x		p	q	r	s	t	u	v	w	x	y	z	~																																		
8x		>																																	8x																																		
9x		.																																	9x		.																																
Ax																																		Ax																																			
Bx																																		Bx																																			
Cx																																		Cx																																			
Dx																																		Dx																																			
Ex																																		Ex																																			
Fx																																		Fx																																			

← → MOVE CURSOR   
 INS SELECT CHAR   
 DEL SELECT DEFAULT CHAR   
 ESC EXIT

Figure 5 - Maintenance Program, Option 1, VIDEO Table

Use the arrow keys to indicate with the blinking cursor the Wang 2200 character code to be changed. Press the [INS] key to select the Wang 2200 code position.

The arrow keys may now be used to indicate a new choice for the displayed character from the table of PC characters on the right. Press the [INS] key again to select the replacement. Wang characters with new representations will be highlighted in the left hand table with their current form displayed.

To restore the original representation of a (highlighted) Wang character code, move the cursor to the character, and press the [DEL] key. To end editing, press the [ESC] key.

**Option 2, Edit KEYBOARD translate table:** Several pages showing the names of Wang 2200 keys or PC2200 key functions are shown in figure 6. Use the page up and down keys, [PgUp] and [PgDn], to select the page showing the key function to be changed. Then use the up and down arrow keys to indicate the key function to be changed with the cursor.

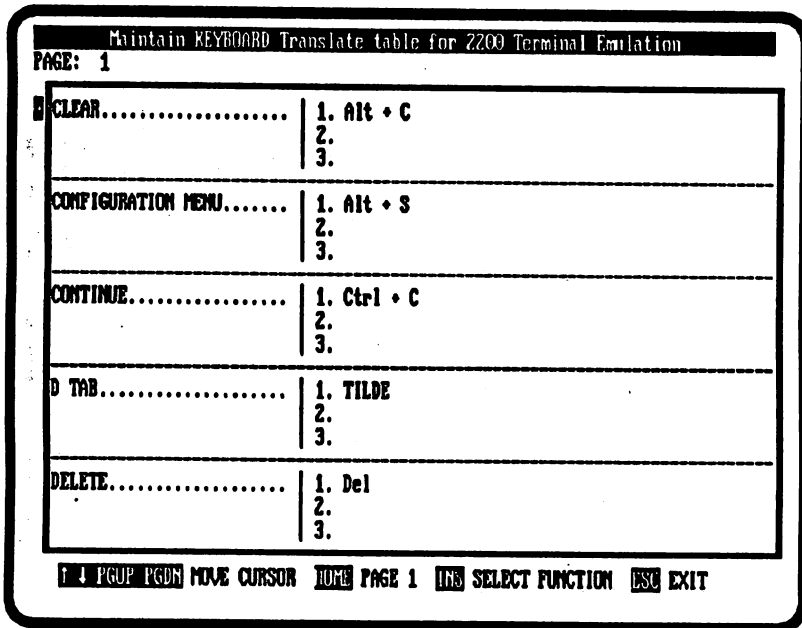


Figure 6 - Maintenance Program, Option 2, KEYBOARD Table

Press [INS] to select the key function. In the terminal emulation program, a key function may be activated by up to three different keystroke combinations, as shown on lines 1 to 3. The arrow keys may be used to indicate one of the three entries. Press [INS] to select the entry. Then press the desired key combination for that

function. Press **[ESC]** once to end the editing of that key function, or use the arrows to select another entry 1 to 3. To end the session press **[ESC]** again until the main menu is displayed.

**Option 3, Edit FONT table:** The hex code of the Wang character to be changed must be known. Enter this two digit code when the program asks for the hex code, and press **[ENTER]**. A large image of the character is displayed (figure 7).

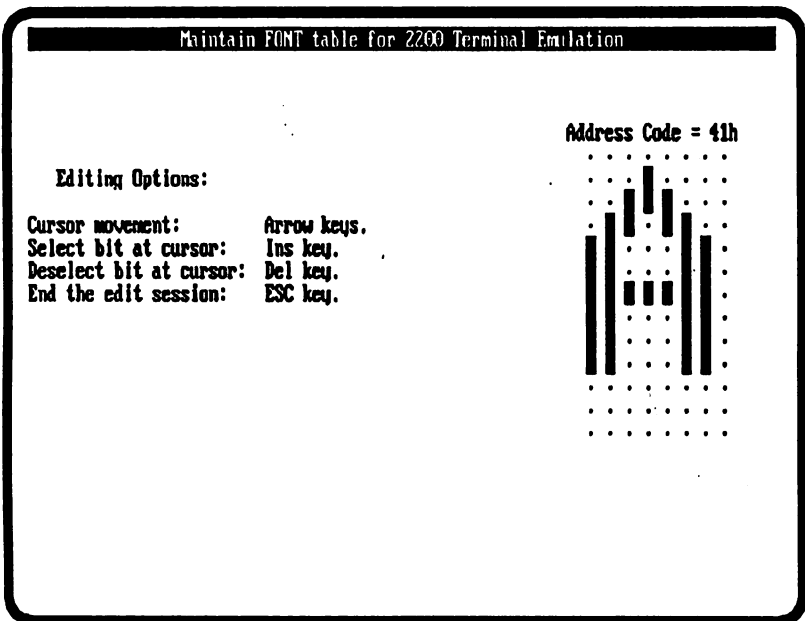


Figure 7 - Maintenance Program, Option 3, FONT Table

The arrow keys may be used to move the cursor to different positions on the character's image. Press the **[INS]** key to mark a dot in the cursor position, or press the **[DEL]** key to remove a dot. Press the **[ESC]** key to finish editing the character. Then enter the hex code of another character to change, or enter 0 to end the character editing session.

**Option 4, Print Keyboard Report:** This option will print the current Keyboard translation table on the printer.

**Option 5, Save and Exit:** This operation saves the changes accumulated since starting the maintenance program and exits to DOS. A menu is presented to allow the selection of tables to save -- the VIDEO, KEYBOARD, FONT, or all tables. Type the appropriate number, and press [ENTER]. (If the changes are not to be saved, choose option 6 to exit.)

**Option 6, Exit:** The maintenance program will return to DOS. No record is kept of the changes made during this session. The old PC22TABL.DAT file will be kept if this option is selected.

Many users have an older version of PC2200 that does not use FONT tables. The maintenance program will update the file PC22TABL.DAT to a new version containing FONT tables. Changes made using the older version will not be lost. The VIDEO and KEYBOARD tables will be kept from the older version with default values chosen for new features. Once the maintenance program has been run, the tables cannot be used on the older version of the program. The new PC2200 program can use the old version of the tables, but will not change them.



## 3.4 **HELP DISPLAY**

---

The key combination **[ALT+H]** displays a help screen showing the various key commands. The **[PgUp]** and **[PgDn]** keys may be used to page through the help screens. Press **[ESC]** to exit from the help screen.

This screen comes from a file called **PC2200.HLP**. The **PC2200.HLP** file may be customized by the user, if desired, by using a text editor to change or create a file by that name. When **[ALT+H]** is pressed during terminal emulation, **PC2200** will first look in the current directory for a file with the name **PC2200.HLP**. If the file is not found there, then the program will look in the directory and disk from which the **PC2200** program was run. If a customized help file is created, it may be placed with the **PC2200** program to be available for all uses, or it may be placed in a specific directory for use only when **PC2200** is run from that directory.

If a customized **PC2200.HLP** file is created, the pages should be separated by **[CTRL+Y]** characters, ASCII code 19 hex. The current **PC2200.HLP** file contains several pages to make this easy.

# 4            **ADDITIONAL FUNCTIONS**

---

Functions of the terminal emulation which relate to the PC are found in this section. Files may be transferred between the PC and the Wang, scripts may be created using record-playback, and DOS programs may be executed while the terminal emulation program remains available.

## 4.1            **FILE TRANSFER AS IF BY KEY- BOARD INPUT**

---

Data in a file on the PC (in ASCII format) may be transferred to the Wang 2200 as though it were typed in at the keyboard of the Wang. This is useful for converting documents from a PC-based word processor to one on the Wang. For programmers, a PC source file may be quickly loaded into the Wang 2200.

Press **[CTRL+K]** to activate Keyboard File Transfer. The screen shown in figure 8 will appear. Enter the DOS filespec for the file of commands to transmit to the Wang and press **[ENTER]**. A complete filespec in the form

**C:\path...\FILENAME.EXT**

may be entered. (See Section 1.3 for an explanation of filespecs.)

Transmission may be terminated by pressing the **[ESC]** key at any time.

Transmission may be halted temporarily by pressing the Halt/Step command key, **[CTRL+S]**, or by pressing the **[CTRL+K]** key again. Each additional depression of the Halt/Step key,

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You have selected **KEYBOARD TRANSFER MODE** which will transfer an ASCII text DOS filespec to the Z200 as if it were being keyed in from the keyboard. You may use this mode to transfer text to any application running on the Z200 which is expecting to receive data from the keyboard. Using **DATA 3500** in the Edit Document mode is a way to make a PC text file into an editable **DATA 3500** document. A **NIAKWA .SRC** file may be transferred to the current partition (remember to **CLEAR** the partition first). See manual for discussion of **.PLY** files.

The **MALT/STEP** and **CONTINUE** keys will halt, step and continue the transfer.

You may cancel this mode at any time by keying **ESC**

Enter DOS filespec

Figure 8 - Keyboard File Transfer

**[CTRL+S]**, will send one additional character or a keyboard command for a single step operation.

When halted, the transmission may be continued by pressing the Continue command key, **[CTRL+C]**, or by pressing **[CTRL+K]**, the Keyboard File Transfer command key, again.

The file extension typed after the period in the file name determines special handling. If the file is a **".SRC"** file, then the file is treated as a 2200 program stored in the decompressed format. If lines do not begin with a line number, the leading spaces are removed, and the text is appended to the previous line. To avoid conflict, use the DOS extension **".SRC"** only when transferring 2200 programs.

File types **".PLY"** are treated as playback files in the record-playback feature described in Section 4.2. Keystrokes or keyboard commands to a 2200 application may be entered in a file on the PC for

automatic transmission to the 2200. These keystrokes may be captured using the "Record" feature discussed in Section 4.2.

## 4.2 RECORD-PLAYBACK

The "Record-Playback" feature allows the PC to capture keystrokes and commands typed to operate Wang 2200 programs. All entered keystrokes are recorded in a file which may be played back with the Keyboard File Transfer command, [CTRL+K].

To start the capture process, press the [CTRL+Q] key combination. The Capture Mode Screen, figure 9, displays. Type the filespec for the file in which keystrokes are to be captured, and press [ENTER]. The capture file which is recorded has a special format, described below, and always has the DOS extension ".PLY". An extension other than ".PLY" will be ignored, and the ".PLY" extension may be omitted.

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:

You have selected KEYSTROKE CAPTURE MODE which will save all of your keystrokes to an ASCII text DOS filespec. The file name you provide will automatically be given a type code of .PLY. A .PLY file may be 'played back' using the KEYBOARD FILE TRANSFER function. You may edit the .PLY file with any standard ASCII text editor. See manual for definition of functions and directives.

Once started, the capture mode may be paused and continued with the Capture Halt key (Ctrl+Q). A capture directive may be entered by keying the Capture Directive key (Alt+Q)

You may cancel this mode at any time by keying ESC

Enter DOS filespec  
\_\_\_\_\_

Figure 9 - Capture Mode Screen

Type the commands to run the desired Wang 2200 program or program sequence. Each keystroke and Wang terminal command is captured in the file. Press the [ESC] key to terminate the capture process and end the capture file.

To temporarily halt the capture process, press the [CTRL+Q], capture mode command key, again. The capture process is toggled on and off with this key, and a message is displayed to show when capture is halted.

The [CTRL+K] keyboard file transfer command may not be used during the capture process. However, a substitute, File Inclusion, is provided below.

Special commands may be entered by pressing [ALT+Q] to obtain the Capture Mode Directives Menu, Figure 10. At the point in the sequence where the [ALT+Q] command was given, the special directive will be recorded.

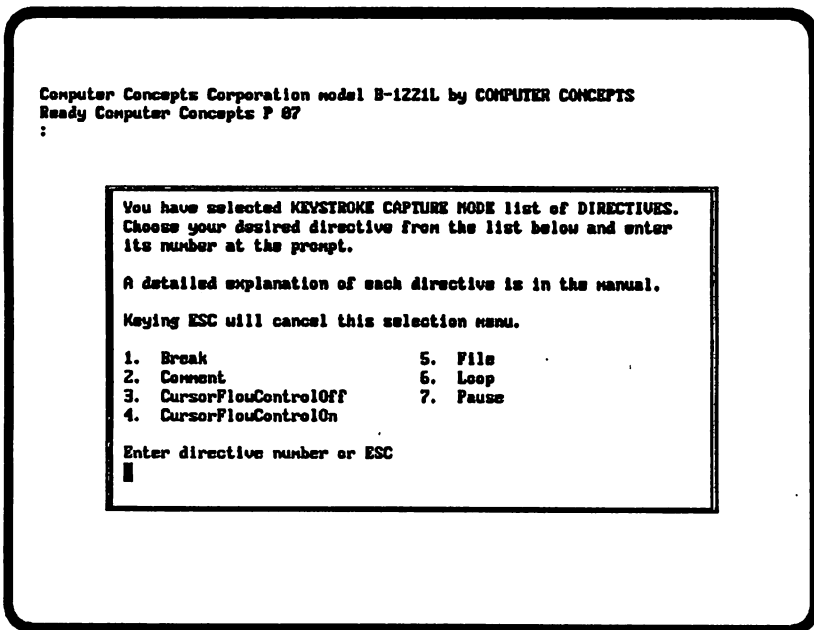


Figure 10 - Capture Mode Directives Menu

The following list describes the directives which may be obtained by [ALT+Q] and their effect during playback. Type the directive number:

**Directive 1, Break.** A prompt is given asking for a message which will be displayed on line 25 during playback. Enter a message and press [ENTER], or just press [ENTER] for no message.

During playback the message (if present) is displayed, and the transmission is halted. (The Continue command, [CTRL+C], or the Keyboard File Transfer command, [CTRL+K], will continue after the break halt. Otherwise, the user may type information into the Wang program while playback is halted.)

**Directive 2, Comment.** A comment will be entered into the capture file. This has no effect during playback, but the message can be read if the ".PLY" file is examined. At the prompt, enter notes to keep track of what is happening, follow by [ENTER].

**Directive 3, Turn OFF Cursor Flow Control.** This turns off the Cursor Flow Control feature, described in Directive 4.

**Directive 4, Turn ON Cursor Flow Control.** Many Wang 2200 application programs turn off the visible cursor and turn it on (make it visible) only when the operator is expected to make keyboard entries. When Cursor Flow Control is ON, the playback feature will only send commands to the Wang when the visible cursor is on. This allows the playback feature to operate with programs that have long pauses (such as during printing of a report). The entries are made only when the application program asks for input.

**Directive 5, File Inclusion.** Another file may be played back or transmitted as if the Keyboard File Transfer command had been given. The steps of this file will be sent to the Wang 2200. ".PLY", ".SRC", or other types of files may be transmitted just like Keyboard File Transfer. When the file transmission is completed during playback, the play back will continue from this point in the current capture file. File inclusions may be nested up to 5 levels.

At the time this directive is chosen, the name of the included file is requested. Type the filespec, and press **[ENTER]**.

**Directive 6, Loop.** The playback process will return to the beginning of the recorded file sequence. (The playback file is rewound.) The file will be played back over and over again.

**Directive 7, Pause.** A prompt will be given asking how many seconds to pause. Type a number (0 to 99999), and press **[ENTER]**. An optional message may be entered by typing a space after the Pause value along with the message.

During the playback process, a delay of the designated number of seconds will occur before proceeding with the next step in playback and the message, if any, will be displayed on the 25th line.

The file captured by the record-capture process has special symbols for all Wang 2200 terminal commands as well as the directives described above. The command name is enclosed in "<" and ">" characters. For example, the RESET function appears as "<Reset>" in the capture file. Each special directive command is found on a separate line. The directives with associated information, menu options 1, 2, 5, 6 and 7 above, have the value or text immediately following the command. The text must not exceed 63 characters (50 characters for the Pause message) in length, or the directive will be ignored.

Each time the **[ENTER]** key is pressed during capture, the symbol "<CR>" appears in the capture file. The actual returns appearing

in the capture file are for ease of reading and are ignored on playback (except for directive commands, which must appear on a line by themselves).

Appendix D gives a complete list of the format for commands and directives for use in ".PLY" files.

## **4.3 USING PC DOS COMMANDS**

---

Commands from the PC environment may be required during operation of the PC2200 terminal. For example, the operator may want to look at a directory to find out what files are available. The PC2200 terminal emulation software allows the operator to leave a 2200 application, perform a DOS operation, and then return to the original 2200 application.

PC2200 allows two methods of interaction with other PC programs. The terminal emulation program may be installed as a "resident" program, which is available at any time by pressing the "hot key" combination **[ALT+W]**. If PC2200 is put in resident operation with the **/R** command line switch, it may be activated at any time during almost any PC program. If PC2200 is not put in "resident" operation, other PC programs may still be used. To return to terminal emulation, the **EXIT** command must be typed from the DOS command prompt. In this case the terminal is not available during other programs by using the "hot key" combination.

The process of leaving the 2200 application is called "shelling out" to DOS. PC2200 acts as an outer shell, allowing DOS commands and programs to be executed, while it resides in memory waiting to be recalled.

If "resident" operation is not used (no **/R** command line switch), press the **[CTRL+X]** combination to temporarily exit to DOS. The system will respond by giving the standard DOS sign-on message. Perform any desired DOS commands or programs (except PC2200). Then type **'EXIT'** at the DOS prompt to return to the



terminal emulation. The screen will appear just as it was when the **[CTRL+X]** key was struck.

If "resident" operation is to be used, start the PC2200 program with the **"/R"** command line switch as follows:

**PC2200 /R                    [ENTER]**

Add any other command line switches that are normally used. To exit to DOS and keep PC2200 available, press the **[CTRL+X]** combination. Then use any PC programs or commands.

At any time, even while these PC programs are in operation, press the **[ALT+W]** key combination to return to the terminal emulation. The terminal screen will appear just as it was left. When **[CTRL+X]** is entered again, the PC program which was in operation will be restored to the screen. **[ALT+W]** and **[CTRL+X]** may be used to switch back and forth between the PC program and the Wang 2200 terminal emulation.

PC2200 is still residing in the PC's memory when the temporary exit to DOS is used. DOS will not have the same amount of memory normally available for use by other programs (PC2200 uses between 59K and 85K). This may prevent some 'memory-intensive' applications from running.

The **[CTRL+X]** temporary exit to DOS requires access to both the security fingerprint (described in Section 2.3) and the DOS command interpreter (COMMAND.COM). An error message will appear if the security fingerprint cannot be located. However, if COMMAND.COM cannot be located and the resident (**/R**) command line switch was not used, then PC2200 will return immediately without an error message, and DOS commands may not be used.

"Resident" operation with the **/R** command line switch may only be used if the security fingerprint is installed on a hard drive. The fingerprint must be available each time terminal emulation is continued. To completely exit to DOS, without leaving PC2200 in memory, press **[CTRL+Z]**. This ends "resident" operation and exits to DOS.

## 4.4 FILE TRANSFER UTILITY PROGRAM

---

An additional program included on the PC2200 distribution disk is a WANG 2200 Basic program which allows file (or disk image) transfer between the WANG 2200 and the PC. The 2200 program uses special advanced programming features of PC2200 to achieve the transfer and, therefore, cannot be executed from a standard WANG terminal. A version of this program which operates with NIAKWAS BASIC2C in SuperDos on a PC is also included.

The MS-DOS files which contain the 2200 source code are located on the PC2200 diskette under the DOS filenames 'PC2200FT.SRC' and 'PC2200F1.SRC'. To load them onto the 2200 disk, perform the following steps during emulation:

Insert the PC2200 distribution diskette into drive A.

Press the RESET key, **[CTRL+R]**.

Type the word **CLEAR** and press **[ENTER]**.

Enter the Keyboard File Transfer Mode, **[CTRL+K]**.

At the prompt for filename, type **A:PC2200FT.SRC** and press **[ENTER]**.

After transmission has completed, save the 2200 program currently in memory to disk. The following 2200 command will attempt to save the program to the 2200 disk surface 310 under the name PC2200FT with 2 extra sectors for growth. The number 310 is an example; chose the appropriate disk location on your system:

**SAVE T/310,(2)"PC2200FT"**

The entire process should be repeated again, substituting the name PC2200F1 for PC2200FT. When this is done, two programs will have been transferred. Both programs must exist on the 2200 for the File Transfer Utility to work.

For NIAKWA's BASIC2C SuperDos systems, use the files named PCB2CFT.SRC and PCB2CF1.SRC instead of the files PC2200FT.SRC and PC2200F1.SRC which are used for Wang 2200 systems. The details of operation remain the same for either version -- just be certain to load the proper version for the system being used.

#### 4.4.1 Special Considerations

The FILE TRANSFER utility program achieves the greatest transfer speed when the PC is attached to the Wang MXE or OPTION-W controller rather than the Wang MXD controller. However, a problem exists with using the MXE controller. The terminal will 'hang' if the terminal number is greater than four and is connected to a MXE controller. This is a problem with the 2200 BASIC and only occurs in versions prior to 2.6.2.

Another consideration is the difference in filenames between the 2200 and DOS. Filenames in the 2200 system are 8 characters long; DOS filenames are 8 characters plus a period and a 3 character extension. This doesn't pose a problem when copying files to the PC, except when a DOS filename already exists with the same name as the 2200 file. If this occurs, the old DOS file is destroyed and rewritten with new data.

However, when copying from the PC to the 2200, the twelve character DOS filespec is shortened to the first eight characters. This may cause problems if there are many PC files with the same first eight characters. The program will give options about what to do if a duplicate name is encountered while copying. However, the best solution is to use DOS filenames of no more than eight characters when files will be transferred to the 2200.

When entering DOS filespecs, names A: and B:, entered without a path or filename, have special meaning to PC2200. These names imply that the DOS filespec is a 'raw diskette' image of a 2200 disk, just like a normal Wang 2275 diskette. It is assumed to be 320K bytes in size, with the typical index sectors and data sectors of a normal 2200 disk surface.

## 4.4.2 Starting the FILE TRANSFER Utility

Once saved onto the 2200 disk, the program may then be loaded and run upon demand. The following 2200 command will load the program from disk surface 310 and then run it:

**LOAD RUN T/310,"PC2200FT"**

When the FILE TRANSFER utility program is started, it will give the following prompt:

**ENTER 1-2200 to PC / 2-PC to 2200 / 0-END**

\_\_\_\_\_

Decide if data will be transferred from the 2200 to the PC or from the PC to the 2200. The prompts given will depend upon which mode is chosen.

## 4.4.3 Transferring from the 2200 to the PC

In the 2200-TO-PC mode, an entire disk, a portion of the disk, or certain files from the 2200 may be copied to the PC. There will also be options about the format in which to store the data on the PC. The sample screen in APPENDIXD is typical of this mode of transfer.

A prompt will be given for each field of data individually. Once all fields have been entered, the system will offer a chance to edit the previously entered fields of data.

CHOOSE TRANSFER METHOD FROM LIST BELOW

COMPUTER  
CONCEPTS

File Transfer Set-up:

1. File transfer direction . 2200 to PC
2. FROM 2200 disk address .. D14 ix= 181 cur end= 48,812 end cat= 58,000000
3. TO DOS filespec ..... b:\test.bs2 (disk image)
4. Transfer method .....

1. COPY 2200 disk sector range to DOS filespec  
(COPY T/D14,( beg , end )TO T/filespec,( beg ))
2. MOVE 2200 catalog to DOS directory\filename(s)  
(MOVE T/D14,"FILENAME(s)"TO directory\filename(s))
3. MOVE 2200 file(s) to diskimage DOS filespec catalog  
(MOVE T/D14,"FILENAME(s)" TO T/filespec,(C))

Figure 11 - File Utility: From 2200 to PC

Listed below are descriptions of each field:

1. **File Transfer Direction** - This is the mode of transfer. Data will be transferred from the 2200 to the PC.
2. **FROM 2200 disk address** - Enter the Wang 2200 disk address to copy from (310, D11, B10, etc.). Once a valid disk address has been entered, the index information from the disk will be displayed.
3. **TO DOS filespec** - Enter the DOS filespec to receive the transmission of data. If the filespec you enter already exists on disk as a 2200 diskimage file (a DOS file that has the same characteristic index sectors and data sectors of a 2200 disk), then that fact will be displayed beside the filename. You may also specify an asterisk either before the period or after the period in the output DOS filespec. The asterisk im-

plies that more than one DOS file will be created; therefore, the transfer method (field #4) will automatically be selected to #2, MOVE 2200 catalog to DOS directory\filename(s). If no asterisks are present, the following prompt displays:

**FOR DOS FILESPEC ENTER 0=NO CHANGE /  
99=SCRATCH DISK**

\_\_\_\_\_

If 0 (NO CHANGE) is selected, the system will accept the filespec entry as is and proceed to field #4. This means that no changes to the DOS filespec will be made prior to the transfer process.

If 99 (SCRATCH DISK) is selected, the system will erase the DOS file and create an empty DOS diskimage file according to the parameters provided. The system will prompt you for the number of index sectors and the end catalog value (typical of the 2200 scratch disk command).

If the entered DOS filespec previously existed as a valid DOS diskimage file, another option will display. This option 1, MOVE END, will allow a move to the 'end catalog' value without scratching the disk. This allows more files to move to the DOS diskimage.

4. **Transfer method** - Different transfer methods will be received depending upon the response to field #3. If the transfer is to a diskimage, three options will be received. Otherwise, just the first two options will be given.

The three possible methods of transfer are described below:

1. **COPY 2200** disk sector range to DOS filespec. This method simulates the Wang 2200 COPY command. You will be prompted for the beginning and ending sec-

tor to copy from the 2200 and also for the sector to begin receiving data within the DOS diskimage file.

2. **MOVE 2200 catalog to DOS directory\filename(s).** This method allows one or more 2200 files to be moved to stand-alone DOS files. (A 'stand-alone' DOS file is a non-diskimage file.)

A prompt is displayed for the 2200 file(s) to copy. The asterisk and the question mark can be used as wildcard characters to select more than one 2200 file. For example, if AP\* is entered, then all 2200 files that begin with AP will be copied. Or if AP???\* is entered, then all files that fit the general form AP???\* will copy.

A prompt will ask whether to copy only 2200 program files, data files, or both. (A 2200 file must be classified as one of the two types.)

Field #3, the output DOS filespec, determines whether a DOS output file is to be created for each 2200 file. Or if the 2200 files are to be sequentially appended to a single DOS filespec.

The presence of an asterisk will cause multiple DOS files to be created. A single asterisk will cause a DOS file to be created for each 2200 file and named accordingly. An asterisk followed by a period and an extension will create DOS files -- with the eight character 2200 file name followed by the previously entered extension.

3. **MOVE 2200 file(s) to diskimage DOS filespec catalog.** This method is similar to the 2200 MOVE command. It will be like moving from one 2200 disk address to another. One difference is that if the filename already exists in the DOS diskimage, it will be overwritten with new data. Furthermore, if the old file is too small, it will be scratched and renamed as a 'JUNK' file.

A new file will then be created with the proper name and size.

Another difference is that the wildcard characters ? and \* are allowed when specifying the 2200 file(s) to be copied. This makes it easy to copy all files that fit a defined naming convention.

#### **4.4.4 Transferring from the PC to the 2200**

In the PC-TO-2200 mode, you will be able to copy DOS files, portions of DOS files, and DOS diskimages to the 2200. The sample screen in APPENDIX D is typical of this mode of transfer.

A prompt will be given for each field of data individually. Once all fields have been entered, the system will offer a chance to edit the previously entered fields of data.

Listed below are descriptions of each field:

1. **File Transfer Direction** - This is the mode of transfer. Data will be transferred from the PC to the 2200.
2. **FROM DOS filespec** - Enter the DOS filespec to copy from. If the entered filespec already exists on disk as a 2200 diskimage file (a DOS file that has the same characteristic index sectors and data sectors of a 2200 disk), then that fact will be displayed beside the filespec.

Wildcard characters (\* or ?) may also be specified in the DOS filespec. The presence of wildcard characters allows more than one DOS file to be copied to the 2200 disk. This causes the transfer method (option 4) to be automatically selected to 2, MOVE DOS directory\filename(s) to 2200 catalog.

3. **TO 2200 disk address** - Enter the Wang 2200 disk address to receive the transmission of data. Typical 2200 addresses



PC2200FT - File Transfer utility 1.6  
CHOOSE TRANSFER METHOD FROM LIST BELOW

COMPUTER  
CONCEPTS

File Transfer Set-up:

1. File transfer direction . PC to Z200
2. FROM DOS filespec ..... b:\test.bs2 (disk image)
3. TO Z200 disk address .... D14 index= 181 cur end= 48,812 end cat= 58,888
4. Transfer method .....

1. COPY DOS filespec to Z200 disk sector range  
(COPY T/filespec,( beg , end )TO T/D14,( beg ))
2. MOVE DOS directory\filename(s) to Z200 catalog  
(MOVE directory\filename(s) TO T/D14,(C))
3. MOVE diskimage DOS filespec file(s) to Z200 catalog  
(MOVE T/filespec,"FILENAME(s)" TO T/D14,(C))

Figure 12 - File Utility: From PC to 2200

are 310, B10, D12, etc. Once a valid disk address is entered the index information from that disk will be displayed.

The system will, at this point, give the following prompt:

ENTER 0=NO CHANGES / 1=MOVE END /  
99=SCRATCH DISK

This provides an opportunity to either extend the 2200 disk catalog area (MOVE END) or to erase the 2200 disk and create a new index (SCRATCH DISK).

4. **Transfer method** - If the transfer is from a DOS diskimage file, all three of the following transfer methods will be

received. Otherwise, only the first two methods will be received.

1. **COPY DOS filespec to 2200 disk sector range.** This method simulates the Wang 2200 COPY command. A prompt will display for the beginning and ending sector to copy from the DOS filespec and for the sector to begin receiving data on the 2200 disk.
2. **MOVE DOS directory\filename(s) to 2200 catalog.** This method allows one or more DOS 'stand alone' files to a Wang 2200 disk. A 'stand alone' file is one that is not a diskimage.

When this method of transfer is used, three options will display on how to handle filename conflicts. A conflict occurs if the DOS filename (truncated to 8 characters) already exists in the output 2200 catalog. The conflict can be solved by either 1) skipping the source file, 2) erasing the existing 2200 file before copying, or 3) creating a unique 2200 filename by randomly changing the filename one character at a time.

**NOTE:** It is recommended that DOS files that are to be transferred be given names of no more than 8 characters, including the period and extension. This would avoid the filename conflict issue altogether.

3. **MOVE diskimage DOS filespec file(s) to 2200 catalog.** This method is similar to the 2200 MOVE command (moving files from one 2200 disk to another). One difference, however, is that if the source 2200 filename (from the DOS diskimage) already exists on the 2200 disk, the source data will overwrite the old data. Furthermore, if the output 2200 disk file is too small to hold the new data, it will be scratched and renamed as a 'JUNK' file. The system will then create a new 2200 file with the proper name and size.

Another difference is that the wildcard characters (\* and ?) are allowed when specifying what 2200 filenames are

to be copied from the DOS diskimage file. This makes it easy to copy files that fit a certain naming convention.

**NOTE:** Timing tests were performed using the FILE TRANSFER Utility on a 4.77 MHZ generic PC clone computer. The following results were obtained:

	<b><u>MXD Controller</u></b>	<b><u>MXE Controller</u></b>
<b>PC to 2200</b>	20.8 K/minute	51.7 K/minute
<b>2200 to PC</b>	56.7 K/minute	60.0 K/minute

Once this utility is finished, control will be passed back to the normal START program.

# **5           ADVANCED PROGRAMMING FEATURES**

---

The PC has capabilities not present in standard WANG terminals. Terminal control sequences have been added or modified in PC2200 to give the Wang 2200 programmer access to some of the PC features. The additional sequences are similar in structure to those employed by WANG in chapter 3 of the 2336DW Interactive Terminal Manual.

## **5.1           ADDITIONAL AND MODIFIED COMMANDS**

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The additional and modified commands and functions are described in detail on the following pages.

### **5.1.1       BOX FUNCTIONS - BOX (height, width)**

When the Wang character Fonts are used (with EGA, VGA, or Hercules + (RamFont) display adapters, and no /ASC switch), then box functions are very nearly identical to the operation on Wang terminals. There are some limitations.

Underscored characters cannot be differentiated from horizontal box elements directly below the characters. If a box is drawn around a row containing underscored characters, and then an UNBOX command is performed, the previously underscored characters will lose their underscore attribute. When a text character

is displayed above a box at either corner, the horizontal element of the corner will extend beyond the connecting vertical. Horizontal box elements take on the Intensity and Blink attributes of the character above (which may be a space character). Displayable characters take priority over vertical box elements. A space character is not considered 'displayable' in this context.

The PC monochrome board is only capable of producing characters, not pixel graphics. Since the 2336 horizontal box lines fall between screen lines, PC2200 cannot exactly emulate the 2200 BOX FUNCTIONS if a monochrome only board is present or the /ASC command switch has been used. However, the PC does provide character BOX graphics and a high level of compatibility can be achieved.

The difference between the 2336 and PC2200 in PC ASCII character mode is that the horizontal elements of the boxes are lowered one-half screen line. This may pose problems if a Wang 2200 application prints text immediately below a horizontal element. Because the text character and BOX character cannot both be displayed simultaneously in the same screen position, PC2200 displays the text character.

Anytime there is a conflict between a printable character (a space is not printable) and a BOX character, PC2200 will display the text character. This means that boxes will never overwrite meaningful text.

PC2200 can be directed to turn off the box display altogether if box display is not wanted. To do this, refer to Section 3.1 for the NO BOXES option available at the command line.

### **5.1.2 INPUT SCREEN alpha variable**

The WANG 2336DW terminal, when connected to a MXE controller or SVP Option-W, has the ability to send screen data back to the 2200 for processing. PC2200 also has the ability to send back screen data, but it is stored in a different format. The only difference is the

content of the character attribute bytes. PC2200 sends back the standard PC character attribute as follows:

## PC Attribute Byte

Bit 80 = 1 if character blinking

Bit 40 = 1 if RED on  
Bit 20 = 1 if GREEN on  
Bit 10 = 1 if BLUE on

→ Background Color

Bit 08 = 1 if high intensity  
Bit 04 = 1 if RED on  
Bit 02 = 1 if GREEN on  
Bit 01 = 1 if BLUE on

→ Foreground Color

If a monochrome card is used, then the following hex values produce different effects:

HEX(00) - Black Characters on Black Background (Invisible)

HEX(77) - White Characters on White Background (Invisible)

HEX(07) - Normal Video

HEX(01) - Underline

HEX(70) - Reverse Video

As in the color card, the 80 bit still signifies blinking and the 08 bit still signifies high intensity.

### **5.1.3 REINITIALIZE TERMINAL - HEX(020D0C030F)**

This command on the 2336 will restore the terminal to its power-on state. PC2200 performs this function and resets the color attributes to the Power-On Default values defined at invocation by the /A, /E, and /I switches on the DOS command line. The RESET key command also performs this function.

### **5.1.4 SELF-IDENTIFICATION MESSAGE - HEX(0208090F)**

This command causes the 2336 to transmit to the applications program the information displayed on the screen at power-on time. The SELF-ID message (consisting of several fields separated by spaces) has been altered in PC2200 to designate that a PC is the terminal type. Instead of the normal '\*2336DW' field, PC2200 will pass '\*2236DI' if a monochrome PC is used in ASCII mode, or it will pass '\*2236CI' if a color PC is used in ASCII mode. If Wang character fonts are used, the message '\*2336DG' will be sent if a monochrome PC is used; the message '\*2336CG' will be sent if a color PC is used. In this manner, a 2200 application can determine what type of terminal is being used and if it has color and Wang font capabilities.

### **5.1.5 ALTERNATE CHARACTER SET - HEX(02 02 xx 0F)**

The PC character set above HEX(7F) does not look like the WANG 2336 alternate character set. The 2336 graphic characters contain all combinations of 1/6 of a character box. The PC uses just 1/2 of a character box. If a 2200 application uses the alternate Wang character set, and the PC ASCII character mode (/ASC switch) is used in the terminal emulation rather than the Wang fonts, then only a small number of the characters will appear completely correct. Refer to Section 3.3, Keys, Fonts Maintenance Program, for more on the PC character set.

### **5.1.6 UNDERLINE (FOR COLOR MONITORS) - HEX(02 04 xx 04 0E)**

If the PC ASCII character mode is used, the PC does not provide for an underline attribute when using a color monitor. PC2200 allows the operator to specify a color to signify underlined text. This color is initially defined when the program is started using the /A switch but can be changed by using the new PC2200 color control sequence defined later in this section.

### **5.1.7 SAVE & RESTORE SCREEN <PC2200 ONLY>**

HEX(020006 00 0E) - SAVE CURRENT SCREEN as PAGE 0  
HEX(020006 00 0F) - RESTORE PAGE 0  
HEX(020006 02 0E) - SAVE CURRENT SCREEN as PAGE 1  
HEX(020006 02 0F) - RESTORE PAGE 1  
HEX(020006 04 0E) - SAVE CURRENT SCREEN as PAGE 2  
HEX(020006 04 0F) - RESTORE PAGE 2



The preceding commands allow a screen to be stored. At a later time, the screen may be restored instantly without having to rebuild it using PRINT statements. It is perfect for HELP screens.

The /S command line switch saves memory by creating space for only one save & restore screen rather than 3. If this switch is used, only one save screen may be used by application programs. The commands for page 1 and 2 will refer to page 0.

### **5.1.8 PRINT SCREEN LINE 25 <PC2200 ONLY>**

HEX(020006 0B 0E);HEX(aa);"user text";HEX(0F)

This command allows text to be written to line 25 of the screen. The HEX(aa) that follows the command is the PC display attribute byte which is passed to each text character. (The PC Attribute Byte is described in detail earlier in this section). All characters will be printed on line 25 until HEX(0F) is received. The message will remain on line 25 until it is overwritten with another message or until line 25 is restored.

### **5.1.9 RESTORE SCREEN LINE 25 TO NORMAL STATE <PC2200 ONLY>**

HEX(020006 0B 0F)

This command removes any text previously written to screen line 25, and restores it to the normal state.

## Sample 2200 Program (COLOR.SRC)

```
10 DIM A$20,B$1,F$1: SELECT PRINT 005(80)
20 DATA 'BLACK','GRAY','BLUE','LIGHT BLUE'
30 DATA 'GREEN','LIGHT GREEN','CYAN','LIGHT CYAN'
40 DATA 'RED','PINK','MAGENTA','LAVENDER'
50 DATA 'BROWN','YELLOW','WHITE','BRITE WHITE'
60 REM -- SET BACKGROUND=BLUE,
   FOREGROUND=WHITE, BORDER=BLUE
70 PRINT HEX(0200060501070B01000F);
80 REM -- CLEAR SCREEN/PRINT TITLE
90 PRINT HEX(0306);TAB(27);"COLOR CHART"
100 REM -- SET BRIGHT ATTRIBUTE/ALTERNATE CHARACTER
   SET
110 PRINT HEX(020402000F);HEX(0202020F);
200 REM -- BEGIN LOOP
210 FOR I=0 TO 7
220 REM -- READ A$ AND PRINT COLOR NAME
230 READ A$: PRINT TAB(12-LEN(A$));A$;
240 REM -- SET FOREGROUND COLOR
250 F$=BIN(I): PRINT HEX(020006050B);F$;HEX(0F);
260 REM -- PRINT BARS
270 A$=ALL(FF): PRINT A$;HEX(0E);A$;HEX(0F);
280 REM -- READ A$/SET FOREGROUND=WHITE/PRINT
   COLOR NAME
290 READ A$: PRINT HEX(020006050B070F);A$
300 REM -- END THE LOOP
310 NEXT I
400 PRINT : END
```

Figure 13 - Sample 2200 Program: COLOR.SRC

## 5.1.10 COLOR CONTROL

<PC2200 ONLY>

HEX(020006 05 0b 0f 0u 0p 0i 0l 0h...0l 0h 0F)

where: b=background color (0-7)

f=foreground color (0-7)

u=underline color (0-7)

p=perimeter (border) color (0-7)

i=border intensity (0=off / 1=on)

l,h ... l,h=16 entries for low and high  
energy palette color (0-7)  
16 entries correspond to  
color codes 0 to F.

This command selects the color codes and palette colors for subsequent display. The entire command is ignored if a monochrome display board is used. A hex value of 0B in any of the variable positions will leave the current value for that position unchanged. If an early hex 0E or 0F is received, the remaining positions will remain unchanged. Wang programs compatible with older versions of PC2200 will send an early hex 0E or 0F, before the palette colors, and will be compatible.

The color codes for b,f,u, and p have the following standard PC default values. (This table also gives the color values for the color palette detailed below.)

0 - BLACK	4 - RED
1 - BLUE	5 - MAGENTA
2 - GREEN	6 - BROWN
3 - CYAN	7 - WHITE

Up to 16 different foreground colors can be achieved by using these standard colors in conjunction with the high intensity attribute if the PC ASCII mode is used. Up to 8 different colors are available if Wang character mode is used.

The sample 2200 program in Figure 13 illustrates the use of the color control sequence by printing a color chart (only if a color monitor is used). The sample program also exists on the PC2200 distribution diskette under the name COLOR.SRC and can be loaded into memory with the Keyboard File Transfer function.

The actual color display may be altered on EGA and VGA displays by controlling the color palette. This is useful for "special effects," fast or flashing colors, or quick modification of a color code's meaning. The 16 l and h entries in the command determine the actual color for a given color code (the palette). The color code may be in the range of 0 to F hex, and each l,h pair in the command controls the color for its respective color code in order. Color codes 0 to 7 are normal color codes. In PC ASCII mode, codes 8 to F are corresponding intensified versions of those color codes. Separate intensified color codes are not available in the Wang character set mode; all intensified colors use color code 5 of the palette.

The actual color which appears for a given color code is the combination of low and high energy colors specified in the positions 'l' and 'h'. On the display the low energy color is added to the high energy color. The high energy color is the strongest component of the resulting color. If 'h' is 0, then only the low energy color appears.

The 'l' (low energy) and 'h' (high energy) positions may have the hex values 0 to 7. They correspond to colors shown in the color table above. The low energy color is just a dim version of the high energy color. A single hex 0B may be used for the l,h pair to leave the previous value in the palette position.

**NOTE:** The palette settings affect colors of characters which are already on the screen. If a character was printed with a certain color code for its foreground or background, and the palette for that color code is changed, then that character's color changes.

## Example of Palette Control:

```
110 PRINT HEX(020006 05 01 07 0B 0B 0B);
120 PRINT HEX(0B 01 02 04 07 0B );
130 PRINT HEX(0B 00 07 0B 04 04);
140 PRINT HEX(0B 0B 0B 0B );
150 PRINT HEX(0B 0B 0B 00 07 0F);
160 PRINT "Red text on blue-green background"
170 PRINT HEX(0E);"Intensified text comes out as normal white"
180 PRINT HEX(020006 05 02 07 0F);
190 PRINT "Pink background, red foreground"
```

This corresponds to the palette settings of the command line switch '/EP11247P744PF07P507'. In this example program color code 1 of the palette (set as the background color code) has l,h values of 1,2. This is bright green but slightly blue. Code 7 (set as the foreground color code) is the very brightest red, (l,h=4,4). Color codes palettes 5 and F are set to normal white (l,h=7,0). (Code 5 is always the intensified color code in Wang character mode. Code F, the intensified code for 7, will be the intensified foreground code in PC ASCII mode.) Code 2 is set white with a little red (light pink) for later use. At line 180, code 2 is used as the background for text, which appears with a pink background.

The Martians game, file '@MRTIAN.SRC' included on the PC2200 diskette, is a demonstration of palette usage and is also a test of proper operation of PC2200.

### 5.1.11 PRINTER TO DISK - HEX(020007yy..0E or 0F) <PC2200 ONLY>

The following commands allow data to be sent via the local printer channel (device /x04) to a PC DOS file. **CAUTION:** This command conflicts with the PRINTER SELECTION feature. The command could be overridden from the keyboard with the Printer Selection command, [CTRL+P]. Only one DOS file may be open to receive output via the local printer channel at any one time.

#### HEX(020007000F);FILESPEC;HEX(0D); - TEST FOR EXISTENCE

Test for existence of the DOS file specification. Returns HEX(31) if found, HEX(30) if not found. The return value is sent over the keyboard channel (KEYIN).

#### example:

```
10 DIM X$1
20 PRINT HEX(020007000F);"C:\TEXT\SPOOL.TXT";HEX(0D);
30 KEYIN X$:IF X$='1' THEN PRINT "FOUND"
40 IF X$='0' THEN PRINT "NOT FOUND"
50 END
```

#### HEX(020007020E);FILESPEC;HEX(0D); - OPEN FILE FOR OUTPUT

Open the DOS file specification to receive printer output. All printer output will be appended to the existing file. Automatically closes any previously opened file.

**HEX(020007020F); - CLOSE PREVIOUSLY OPENED FILE**

**HEX(020007040E);FILESPEC;HEX(0D); - CREATE DOS FILE**

Create DOS file with a length of 0 bytes. Will automatically close any previously opened file.

The normal sequence to open a DOS file to receive output should be:

1. TEST FOR EXISTENCE
2. IF FILE DOES NOT EXIST, CREATE DOS FILE
3. OPEN FOR OUTPUT

When the transfer is complete, CLOSE the previously opened DOS filespec. This directs printer output back to the local printer.

### **5.1.12 LINE PRINTER TRANSLATION CONTROL**

**<PC2200 ONLY>**

The following commands allow control of the translation and filtering of the data for printer or printer output to a DOS file.

**HEX(020007060E); - LPT Filter 1A is set ON** (Default, depending on command line switches or setup menu settings.) Filters hex 1A character from end of files so that DOS programs will not be confused about the location of the end of ASCII text files.

**HEX(020007060F); - LPT Filter 1A is set OFF.** 1A characters will not be removed from files.

**HEX(020007070E); - LPT Wang to PC translation is set ON.** Wang to PC video translation table will be used on

the printer channel. If a custom VIDEO translation table was set up with PC22MNTN maintenance program, this table will be used to translate from Wang to ASCII.

HEX(020007070F); - LPT Wang to PC translation is set OFF. (Default, depending on command line switches or setup menu settings.)

HEX(0200070B0E); - LPT NO LineFeed is set ON. (Default depending on command line switches and setup menu settings.) A LineFeed character, hex 0A, will not be inserted after each Return character, hex 0D, which appears in the printer data.

### **5.1.13 FILE TRANSFER COMMANDS <PC2200 ONLY>**

PC2200 allows for the transfer of data between the 2200 and the PC disk through a series of terminal control sequences. The transfer is accomplished via the 2200 printer channel when data is sent to the PC disk, or via the keyboard channel when data is received from the PC disk.

The process of writing a BASIC2 program to take advantage of these new terminal sequences is complex and requires expertise in both 2200 Basic language and DOS file handling. It is highly recommended that the File Transfer Utility program (described in Section 4.4) be used or modified to meet the file transfer programming requirements. However, if this is not possible, documentation of these File Transfer terminal control sequences may be obtained by contacting our Support Personnel.



## 6 SAMPLE SESSIONS

---

### 6.1 TRANSFER 2200 PROGRAM TO PC

---

It is possible to transfer a 2200 Program to a DOS filespec by using the PRINTER REDIRECTION feature described in Section 5. The DOS output file would, in effect, receive the ASCII text normally sent to the printer. Below are commands to load and transfer the 2200 program TESTPGM located on the 2200 disk surface /D11 to the DOS filespec A:TESTPGM.SRC

```
CLEAR
LOAD T/D11,'TESTPGM'
[CTRL + P] -----> Begins PRINTER REDIRECTION feature.
                    At the prompt for the Printer Channel
                    Target, type A:TESTPGM.SRC
```

```
SELECT LIST 704(0) ---> 704 tells the 2200 not to output an
                        extra HEX(0A) or HEX(00) after each
                        carriage return character.
```

```
LISTD
SELECT LIST 005(80)
[CTRL + P] -----> You should re-enter PRINTER
                    REDIRECTION to set the printer back to
                    the original parallel port.
                    (Closes file A:TESTPGM.SRC)
```

## 6.2            **TRANSFER PC SOURCE FILE (.SRC) TO 2200 MEMORY**

---

If a 2200 ASCII source program exists on the PC in a DOS filespec, it is possible to load that source file directly into 2200 memory using the **KEYBOARD FILE TRANSFER** mode.

However, the DOS extension ".SRC" holds special meaning for the **KEYBOARD FILE TRANSFER** mode. This is necessary because most ASCII source files are stored in a decompressed format (by using **LISTD** command). If a ".SRC" file is being transmitted, the presence of a line number denotes a new line. Otherwise, leading blanks up to the colon are stripped, and the line will be appended to the previous line.

Below are the commands necessary to load the DOS file **A:TESTPGM.SRC** (containing a 2200 ASCII source program) into the 2200 memory:

**CLEAR**  
**[CTRL+K] ---->** This command invokes the **KEYBOARD FILE TRANSFER** mode.  
Enter **A:TESTPGM.SRC** at the prompt for the DOS filespec.

PC2200 displays each character as it is received from the file, just as if it were typed from the keyboard. When transmission is complete, the normal WANG 2200 colon and cursor will appear.

## **6.3 PRINT SCREEN TO PRINTER OR DOS FILE**

---

The WANG 2336 terminal has the ability to dump the screen text to a local printer by pressing and holding the EDIT key until it clicks. PC2200 also has that capability; however, it is invoked in a different manner.

By holding down the SHIFT key and pressing the PRTSC key, PC2200 will perform the dump to the printer. If you have previously redirected the printer output to a DOS file, it will also receive the 'screen dump.'

## **6.4 TRANSFER PC TEXT FILE TO DATA3500**

---

The need may arise to transfer text from a PC-based word processing system to a WANG 2200 word processing system like DATA3500. This can be quickly accomplished by using the KEYBOARD FILE TRANSFER mode while editing the document with DATA3500.

To do so, key **[CTRL+K]** when the cursor is at the location (in the DATA3500 document) to begin transferring data. Once the DOS filespec is entered, characters will be displayed as they are transmitted - just as if they were keyed from the keyboard. (Remember that DOS files with an extension of ".SRC" should only be used with 2200 source program listings.)

To insert a page break during transmission, halt the transferral with the **[CTRL+S]** again. Single step the transmission of characters by keying **[CTRL+S]** until a convenient place for the page break is reached. Then manually enter the page break command in the DATA3500 document. Continue the transmission with the Continue key, **[CTRL+C]**.

## 6.5 RECORD-PLAYBACK SCRIPT CAPTURE EXAMPLE

---

A playback script will be created which loads and runs the START program at a user selected disk address. The script will be captured using the [CTRL+Q] capture command during an actual test of the procedure, then the captured script will be tested.

Press [CTRL+Q] to start the Capture process. A menu will appear requesting the captured ".PLY" file name. Type

**TEST** [ENTER]

The script will be recorded in the file "TEST.PLY". Place a comment in the script file telling the file's purpose. Follow with [ALT+Q], press '2', then press [ENTER]. (This will perform the Comment directive). Type the following remark (one line):

**Playback Script to load and run START  
program.** [ENTER]

This comment will have no effect on operation of the playback script, but is useful for any reader of the playback script file.

Press the Reset command [CTRL+R] to reset the terminal and the Wang. The Wang 2200 requires some time to complete the Reset command. The playback script should allow for this time.

Press [ALT+Q], chose directive 7, "Pause," and press [ENTER]. A prompt will appear asking how many seconds to delay. Type 2, and follow by [ENTER].

Commands to choose the disk are needed. Type

**SELECT DISK**

DO NOT press [ENTER] at this time. Press the space bar once after the word "DISK." Then press [ALT+Q], and select directive 1, the Break command, by typing 1 and [ENTER]. A

prompt is given for a message to display during playback. Type the following text (one line), and follow the whole line by [ENTER]:

**Enter disk address. Then press ENTER  
and CTRL + C**

For the capture process to parallel the captured playback script, the entry of a disk address is now required. However, this entry is only for the current test and should not be captured in the playback script file. Turn off capture by pressing [CTRL+Q]. A "Capture HOLD" message will display. Type a valid disk address (310, B10, D12, etc.), and follow by [ENTER].

Start the capture process again by pressing [CTRL+Q]. The "Capture To: filename" message will display again.

Type

**load run [ENTER]**

The START program for the specified disk address will now execute. The complete sequence for the playback script has been captured. Press the [ESC] key to terminate the capture process.

The playback script file "TEST.PLY" just created should look like the following. Exit to DOS with [CTRL+X] and use the "TYPE TEST.PLY" command to display the file:

```
<[Comment]>Playback Script to load and run START program.  
<RESET>  
<[Pause]> 2  
SELECT DISK  
<[Break]>Enter disk address. Then press ENTER and CTRL+C  
load run<CR>
```

Return to PC2200 with the DOS **EXIT** command, press **[CTRL+R]** to reset the Wang, and try the script with **[CTRL+K]**. Type

**TEST.PLY**

**[ENTER]**

at the playback file name prompt. Operation should parallel the actions and description in the capture process.

# APPENDICES

## Appendix A - KEYBOARD EQUIVALENCE TABLE

<u>Wang Terminal Function</u>	<u>PC Key Combination</u>
SF' 0 .....	ALT + F10
SF' 1 .....	F1
SF' 2 .....	F2
SF' 3 .....	F3
SF' 4 .....	F4
SF' 5 .....	F5
SF' 6 .....	F6
SF' 7 .....	F7
SF' 8 .....	F8
SF' 9 .....	F9
SF' 10 .....	F10
SF' 11 .....	SHIFT + F1 or F11 (*Enhanced kbd <sup>1</sup> .)
SF' 12 .....	SHIFT + F2 or F12 (*Enhanced kbd.)
SF' 13 .....	SHIFT + F3
SF' 14 .....	SHIFT + F4
SF' 15 .....	SHIFT + F5
SF' 16 .....	SHIFT + F6
SF' 17 .....	SHIFT + F7
SF' 18 .....	SHIFT + F8
SF' 19 .....	SHIFT + F9
SF' 20 .....	SHIFT + F10
SF' 21 .....	CTRL + F1 or SHIFT + F11 (*Enh.)

---

1 \* Enhanced kbd. = Only available on enhanced AT keyboard.





SETUP MENU .....ALT + S  
SHELL OUT .....CTRL + X  
SOUTH (Cursor Arrow) ..... South Cursor Arrow  
WEST (Cursor Arrow) ..... West Cursor Arrow  
QUIT .....CTRL + Z  
SHIFT DELETE .....CTRL + DEL  
(\*Enhanced kbd.)  
SHIFT EAST .....CTRL + East Cursor Arrow  
SHIFT EDIT (CANCEL) .....CTRL + END  
SHIFT GL .....ALT + G  
SHIFT INSERT .....CTRL + INS  
\*Enhanced kbd.)  
SHIFT NEXT SCREEN .....CTRL + PgDn  
SHIFT NORTH (Cursor Arrow) .CTRL + North Cursor (\*Enh.)  
SHIFT PREVIOUS SCREEN ....CTRL + PgUp  
SHIFT SOUTH (Cursor Arrow) .CTRL + South Cursor (\*Enh.)  
SHIFT WEST (Cursor Arrow) ..CTRL + West Cursor Arrow

\*Enhanced kbd. = Only available on enhanced AT keyboard.

# NIAKWA Default Keyboard Assignments

The NIAKWA keyboard assignment may be set from the Setup menu or from the command line switches for compatibility with BASIC2C for the PC. The NIAKWA keyboard assignments are the same as the standard keyboard assignments, except for the special function keys:

## NIAKWA Terminal Function PC Key Combination

SF' 0	F1
SF' 1	F2
SF' 2	F3
SF' 3	F4
SF' 4	F5
SF' 5	F6
SF' 6	F7
SF' 7	F8
SF' 8	F9
SF' 9	F10
SF' 10	SHIFT + F1
SF' 11	SHIFT + F2
SF' 12	SHIFT + F3
SF' 13	SHIFT + F4
SF' 14	SHIFT + F5
SF' 15	SHIFT + F6
SF' 16	ALT + F1
SF' 17	ALT + F2
SF' 18	ALT + F3
SF' 19	ALT + F4
SF' 20	ALT + F5
SF' 21	ALT + F6
SF' 22	ALT + F7
SF' 23	ALT + F8
SF' 24	ALT + F9
SF' 25	ALT + F10

SF' 26 .....CTRL + F1  
SF' 27 .....CTRL + F2  
SF' 28 .....CTRL + F3  
SF' 29 .....CTRL + F4  
SF' 30 .....CTRL + F5  
SF' 31 .....CTRL + F6

# Wang 720 Series Keyboard Assignments

## Wang Terminal Function    PC Key Combination

SF' 0	.....	F1
SF' 1	.....	F2
SF' 2	.....	F3
SF' 3	.....	F4
SF' 4	.....	F5
SF' 5	.....	F6
SF' 6	.....	F7
SF' 7	.....	F8
SF' 8	.....	F9
SF' 9	.....	F10
SF' 10	.....	F11
SF' 11	.....	F12
SF' 12	.....	F13
SF' 13	.....	F14
SF' 14	.....	F15
SF' 15	.....	F16
SF' 16	.....	F17
SF' 17	.....	F18
SF' 18	.....	F19
SF' 19	.....	F20
SF' 20	.....	F21
SF' 21	.....	F22
SF' 22	.....	F23
SF' 23	.....	F24
SF' 24	.....	F25
SF' 25	.....	F26
SF' 26	.....	F27
SF' 27	.....	F28
SF' 28	.....	F29
SF' 29	.....	F30
SF' 30	.....	F31
SF' 31	.....	F32

CLEAR ..... ALT + C  
 CONTINUE ..... CTRL + C  
 D TAB ..... DTAB  
 DELETE ..... DEL  
 DISPLAY HELP ..... ALT + H  
 EAST (Cursor arrow) ..... East Cursor Arrow  
 EDIT (CANCEL) ..... Cancel  
 ERASE LINE ..... ERASE  
 ERASE TO EOL ..... SHIFT LEFT BRACKET  
 GL ..... GL  
 HALT/STEP ..... CTRL + S  
 INPUT SCREEN REQUEST .... CTRL + PrtSc  
 INSERT ..... INS  
 KEYBOARD FILE TRANSFER .. CTRL + K  
 KEYCAPTURE DIRECTIVES .... ALT + Q  
 KEYSTROKE CAPTURE ..... CTRL + Q  
 LOAD ..... SHIFT + EXEC  
 NEXT SCREEN ..... Next Screen  
 NORTH (Cursor Arrow) ..... North Cursor Arrow  
 PREVIOUS SCREEN ..... Prev Screen  
 PRINT ..... ALT + P  
 PRINTER REDIRECTION ..... CTRL + P  
 RECALL ..... ACCENT  
 RESET ..... SHIFT + HELP  
 RUN ..... EXEC  
 SETUP MENU ..... ALT + S  
 SHELL OUT ..... CTRL + X  
 SOUTH (Cursor Arrow) ..... South Cursor Arrow  
 WEST (Cursor Arrow) ..... West Cursor Arrow  
 QUIT ..... CTRL + Z  
 SHIFT DELETE ..... SHIFT + DELETE  
 SHIFT EAST ..... SHIFT + EAST  
 SHIFT EDIT (CANCEL) ..... SHIFT + CANCEL  
 SHIFT GL ..... SHIFT + GL  
 SHIFT INSERT ..... SHIFT + INSERT  
 SHIFT NEXT SCREEN ..... SHIFT + NextScreen  
 SHIFT NORTH (Cursor Arrow) . SHIFT + NORTH CURSOR

SHIFT PREVIOUS SCREEN . . . . SHIFT + PrevScreen  
SHIFT SOUTH (Cursor Arrow) . SHIFT + SOUTH CURSOR  
SHIFT WEST (Cursor Arrow) . . SHIFT + WEST CURSOR

\*Enhanced kbd. = Only available on enhanced AT keyboard.

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## **Appendix B - DISPLAYABLE CHARACTER TABLES**

The tables on the following pages contain the characters that will be displayed when a WANG 2200 application calls for HEX characters. The current language set selected determines the table used.



# Azerty French Flemish

		High Order HEX Digit															
		1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
Low Order HEX Digit	0	â	0	@	P	°	p	.	.								
	1	ê	!	1	A	Q	a	q	♦	◇							
	2	î	"	2	B	R	b	r	▷	▲							
	3	ô	#	3	C	S	c	s	◀	▼							
	4	û	\$	4	D	T	d	t	→	↓							
	5	ä	%	5	E	U	e	u	┌	└							
	6	ë	&	6	F	V	f	v		✓							
	7	ï	'	7	G	W	g	w	"	°							
	8	ö	(	8	H	X	h	x	'	{							
	9	ü	)	9	I	Y	i	y	'	}							
	A	à	*	:	J	Z	j	z	^	▲							
	B	è	+	:	K	[	k	§	■	□							
	C	ù	,	<	L	\	l	£	??								
	D	â	-	=	M	]	m	é	‡								
	E	ö	.	>	N	↑	n	§	ß								
	F	ü	/	?	O		o	ç	†								

# Canadian

		High Order HEX Digit															
		1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
Low Order HEX Digit	0	â		0	@	P	°	p	.	.							
	1	ê	!	1	A	Q	a	q	♦	◇							
	2	î	"	2	B	R	b	r	►	▲							
	3	ô	#	3	C	S	c	s	◄	▼							
	4	û	\$	4	D	T	d	t	→	↓							
	5	â	%	5	E	U	e	u	-	¬							
	6	ê	&	6	F	V	f	v		✓							
	7	î	'	7	G	W	g	w	°								
	8	ô	(	8	H	X	h	x	'	†							
	9	û	)	9	I	Y	i	y	`	‡							
	A	â	*	:	J	Z	j	z	^	△							
	B	ê	+	;	K	[	k	]	■	□							
	C	û	,	<	L	\	l	é	¶								
	D	â	-	=	M	]	m	é	‡								
	E	ê	.	>	N	↑	n	§	¶								
	F	û	/	?	O	o	ç	¶									

# Cyrillic/Latin

		High Order HEX Digit															
		1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
Low Order HEX Digit	0	â	0	@	P	Ю	П	.	.								
	1	ê	!	1	A	Q	A	Я	♦	♦							
	2	î	"	2	B	R	Б	Р	►	▲							
	3	ô	#	3	C	S	Ц	С	◀	▼							
	4	û	\$	4	D	T	Д	Т	→	↓							
	5	ä	%	5	E	U	Е	У	┌	└							
	6	ë	&	6	F	V	Ф	В	┐	┘							
	7	ï	'	7	G	W	Г	В	•	°							
	8	Ë	(	8	H	X	Х	Ъ	'	{							
	9	ö	)	9	I	Y	И	Ы	`	}							
	A	Ü	*	:	J	Z	И	Э	^	▲							
	B	Г	+	:	К	È	К	Ш	■	□							
	C	§	,	<	L	\	Л	Э	!!								
	D	Г	-	=	М	Ъ	М	Щ	‡								
	E	.	>	N	†	H	Ч	Ф									
	F	/	?	0	0	0	0	0	0	0							

# Danish Norwegian

High Order HEX Digit

Low Order HEX Digit

	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	â	o	@	P	\	p	.	'							
1	ê	!	1	A	Q	a	q	♦	◇						
2	î	"	2	B	R	b	r	▷	△						
3	ô	#	3	C	S	s	←	▽							
4	û	\$	4	D	T	t	→	↓							
5	ä	%	5	E	U	e	u	┌	└						
6	ë	&	6	F	V	f	v	┐	┘						
7	ï	'	7	G	W	g	w	•	°						
8	ö	(	8	H	X	h	x	´	¸						
9	ü	)	9	I	Y	i	y	¸	¸						
A	à	*	:	J	Z	j	z	^	△						
B	ı	+	:	K	æ	k	æ	■	□						
C	š	,	<	L	Ø	l	ø	!!							
D	ı	-	=	M	Å	m	å	‡							
E	é	.	>	N	↑	n	£	£							
F	ü	/	?	O	o	ç	¶								

# Finnish Swedish

		High Order HEX Digit															
		1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
Low Order HEX Digit	0	@	0	é	P	é	p	.	.								
	1	æ	!	1	A	Q	a	q	◊	◊							
	2		"	Z	B	R	b	r	▶	▲							
	3	ø	#	3	C	S	c	s	◀	▼							
	4	\	\$	4	D	T	d	t	→	↓							
	5	§	%	5	E	U	e	u	┌	└							
	6	£	&	6	F	V	f	v		✓							
	7	á	'	7	G	W	g	w	"	°							
	8	à	(	8	H	X	h	x	'	{							
	9	è	)	9	I	Y	i	y	`	}							
	A	ù	*	:	J	Z	j	z	^	▲							
	B	í	+	:	K	Ä	k	ä	■	□							
	C	°	,	<	L	Ö	l	ö	!!								
	D	ı	-	=	M	Å	m	å	‡								
	E	†	.	>	N	Ü	n	ü	ß								
	F	Æ	/	?	O	I	o	i	¶								

# German

High Order HEX Digit

Low Order HEX Digit

	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	â	0	@	P	°	p	.	.							
1	ê	†	1	A	Q	a	q	♦	◇						
2	î	"	2	B	R	b	r	▷	△						
3	ô	#	3	C	S	s	c	◀	▽						
4	û	\$	4	D	T	d	t	→	↓						
5	+	%	5	E	U	e	u	-	¬						
6	ë	&	6	F	V	f	v	∨							
7	ï	'	7	G	W	g	w	°							
8	à	(	8	H	X	h	x	′	†						
9	è	)	9	I	Y	i	y	˘	‡						
A	û	*	:	J	Z	j	z	^	△						
B	l	+	:	K	Ä	k	ä	■	□						
C	\	,	<	L	Ö	l	ö	††							
D	l	-	=	M	Ü	m	ü	‡							
E	é	.	>	N	†	n	§	¶							
F	ß	/	?	O	l	o	ç	¶							

# Icelandic

		High Order HEX Digit															
		1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
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	5	ý	%	5	E	U	e	u	┌	└							
	6	á	&	6	F	V	f	v	┐	┘							
	7	é	'	7	G	W	g	w	•	◦							
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	9	]	)	9	I	Y	i	y	`	}							
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# Katakana

		High Order HEX Digit															
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	7	キ	'	7	G	W	ヌ	ヲ	レ	レ							
	8	7	(	8	H	X	ヌ	リ	レ	レ							
	9	7	)	9	I	Y	ル	ル	レ	レ							
	A	コ	*	:	J	Z	ル	レ	▲	▲							
	B	ク	+	;	K	[	レ	レ	□	□							
	C	ク	,	<	L	キ	フ	フ	!!								
	D	ス	-	=	M	]	フ	フ	↑	↓							
	E	セ	.	>	N	↑	フ	フ	レ	レ							
	F	ヤ	/	?	O	+	レ	レ	レ	レ							



# Netherlands

		High Order HEX Digit															
		1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
Low Order HEX Digit	0	â		0	@	P	°	p	.	.							
	1	ê	!	1	A	Q	a	q	♦	◇							
	2	î	"	2	B	R	b	r	►	▲							
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	4	û	\$	4	D	T	d	t	→	↓							
	5	ä	%	5	E	U	e	u	-	¬							
	6	ë	&	6	F	V	f	v		✓							
	7	ï	'	7	G	W	g	w	"	°							
	8	ö	(	8	H	X	h	x	'	¸							
	9	ü	)	9	I	Y	i	y	`	¸							
	A	à	*	:	J	Z	j	z	^	△							
	B	è	+	:	K	[	k	¸	■	□							
	C	ù	,	<	L	\	l	¸	!!								
	D	ä	-	=	M	]	m	é	‡								
	E	ö	.	>	N	†	n	¸	ß								
	F	ü	/	?	O	†	o	¸	¶								

# Spanish Spanish/Latin

High Order HEX Digit

	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
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	1	é	!	1	A	Q	a	q	♦	♦	.	.	.	.	.
	2	í	"	2	B	R	b	r	▶	▲	.	.	.	.	.
	3	6	#	3	C	S	c	s	◀	▼	.	.	.	.	.
	4	û	\$	4	D	T	d	t	→	↓	.	.	.	.	.
	5	à	%	5	E	U	e	u	┌	└	.	.	.	.	.
	6	è	&	6	F	V	f	v		✓	.	.	.	.	.
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	8	.	(	8	H	X	h	x	'	{	.	.	.	.	.
	9	ï	)	9	I	Y	i	y	'	}	.	.	.	.	.
	A	ü	*	:	J	Z	j	z	^	▲	.	.	.	.	.
	B	ü	+	:	K	[	k	]	■	□	.	.	.	.	.
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	D	G	-	=	M	]	m	&	‡	.	.	.	.	.	.
	E	ñ	.	>	N	↑	n	è	ß	.	.	.	.	.	.
	F	ñ	/	?	O		o	ç	†	.	.	.	.	.	.

# Swiss French Swiss German

		High Order HEX Digit															
		1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
Low Order HEX Digit	0	â	o	@	P	`	p	.	.								
	1	ê	†	1	A	Q	a	q	♦	◇							
	2	î	"	2	B	R	b	r	▶	▲							
	3	ô	#	3	C	S	s	s	◀	▼							
	4	û	\$	4	D	T	d	t	→	↓							
	5	ä	%	5	E	U	e	u	←	↵							
	6	ë	&	6	F	V	f	v		✓							
	7	ÿ	'	7	G	W	g	w	°								
	8	ö	(	8	H	X	h	x	´	{							
	9	ü	)	9	I	Y	i	y	`	}							
	A	à	*	:	J	Z	j	z	^	△							
	B	è	+	;	K	[	k	†	■	□							
	C	ù	,	<	L	\	l	↓	!!								
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# United Kingdom United States

High Order HEX Digit

		High Order HEX Digit															
		1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
Low Order HEX Digit	0	â	0	@	P	°	p	.	°								
	1	ê	!	1	A	Q	a	q	♦	◇							
	2	î	"	2	B	R	b	r	▷	▲							
	3	ô	#	3	C	S	c	s	◀	▼							
	4	û	\$	4	D	T	d	t	→	↓							
	5	ä	%	5	E	U	e	u	┌	┐							
	6	ë	&	6	F	V	f	v		✓							
	7	ï	'	7	G	W	g	w	°								
	8	ö	(	8	H	X	h	x	{								
	9	ü	)	9	I	Y	i	y	}								
	A	à	*	:	J	Z	j	z	^	▲							
	B	ê	+	;	K	I	k	§	■	□							
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	D	Ä	-	=	M	]	m	é	‡								
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	F	Ü	/	?	O	←	o	¢	↑								

## Appendix C - ERROR MESSAGES

When PC2200 is started, an error message may be displayed if the serial port number requested does not exist. If this happens, the following message displays:

can't find serial port n (where n = the requested port #)

If the /PLfilespec command line switch is used, and the requested file cannot be found, then the following message displays:

can't find: filename (where filename = requested name)

Once terminal emulation has started, PC2200 reserves line 25 of the screen display for error messages and error prompting. If an error condition occurs, the bell will sound, and the appropriate error message will appear in reverse video on line 25 of the display.

If an unexpected DOS error occurs (such as a disk error), the options (R)etry or (A)bort will be displayed. The only valid response at this time is the A or the R key. If R is pressed, the operation which caused the error will be attempted again; if A is struck, the procedure is aborted, and normal terminal emulation continues.

If anticipated error conditions occur (such as an infringement upon security), the error message will be displayed with the message "touch any key." Once a key is pressed, normal terminal emulation continues.

## Appendix D - .PLY RECORD-PLAYBACK FILE FORMAT

The text of all keystrokes typed to a Wang 2200 application can be captured in a playback ".PLY" file using the Capture command [ALT+Q]. A playback file may also be created by use of a text editor on the PC.

The normal characters to be sent to the Wang 2200 application are in their normal readable ASCII form. Actual return characters in the playback file are ignored, and the symbol "<CR>" is used to indicate the RETURN or ENTER key.

The following list shows the special Wang 2200 key functions that may also be entered in the playback file. The functions are typed as a function name, surrounded by "<" and ">". The characters may be upper or lower case.

- <BkSp>
- <CLEAR>
- <CONTINUE>
- <CR>
- <DTab>
- <Delete>
- <East>
- <Edit>
- <EraseEOL>
- <EraseLine>
- <GL>
- <HaltStep>
- <Insert>
- <LOAD>
- <NextScreen>
- <PRINT>
- <PrintScreen>
- <Quit>
- <Recall>
- <RedirectLPT> filespec
- <RESET>

<RUN>  
<SF'0> ... <SF'31>  
<ShDelete>  
<ShEast>  
<ShEdit>  
<ShellOut>  
<ShGL>  
<ShInsert>  
<ShNextScreen>  
<ShNorth>  
<ShPrevScreen>  
<ShSouth>  
<ShTab>  
<ShWest>  
<South>  
<Tab>  
<West>

Special directives are commands which control the playback function itself. Special directives are in the form:

<[directive]> text

The special directive must be on a line by itself. If the directive requires text, the text must not exceed 63 characters, or the special directive will be ignored and transmitted as text to the Wang 2200 application.

<[Break]> text to appear on line 25, maximum of 63 characters.

This causes the playback to halt and displays the text on line 25. Press the continue command **[CTRL+C]** to resume playback.

**<[CursorFlowControlOff]>**

This turns cursor flow control off.

**<[CursorFlowControlOn]>**

This turns cursor flow control on. Transmission to the Wang application will be held until the application enables the visible cursor.

**<[File]> file specification (maximum of 63 characters)**

This directive includes the specified file as though the Keyboard File Transfer command were given at the point of the directive's appearance. The specified file for transmission may be another ".PLY" file, a ".SRC" file, or a normal character data file.

**<[Loop]>**

This causes the playback to start at the beginning of the current ".PLY" file again.

**<[Pause]> nnnnn (number in range 0 to 99999)[Comment]**

Pause for nnnnn seconds.

**<[Comment]> Text for documentation; ignored.**

**63 characters.**

Comment for documentation in the ".PLY" file only. These directives are skipped over and have no effect on playback operation.



## Appendix E - Common Questions

**Here are some commonly asked questions and the answers:**

**QUESTION:** When trying to install the Security Fingerprint (SFP) using HDCOPY, the program aborts with the error "DOS ERROR 602". What's wrong?

**ANSWER:** This error is reported when the install program, HDCOPY, cannot find the file COMMAND.COM, specifically the one used when the PC was booted up. Normally, this error occurs when booting from a floppy drive and the boot disk was subsequently removed. DOS has set COMSPEC=A: (telling DOS where to look for COMMAND.COM), and now can't find the file since the disk with that file has been removed and replaced (probably) by another diskette.

You can determine what COMSPEC is set to by typing the command

**SET                    [ENTER]**

at the DOS prompt. The display will show several parameters that have been set, including COMSPEC. If the COMSPEC source is no longer available (i.e., the diskette containing COMMAND.COM has been removed) or COMSPEC is not in the current PATH, DOS cannot find it. One solution is to copy the file COMMAND.COM to the PC2200 diskette.

**QUESTION:** Why does the system beep at me when transferring files from the Wang 2200 to the PC?

**ANSWER:** Chances are, you're connected to a Wang MXE port. The beep is actually generated by the MXE when it refuses a transferred character. PC2200 recognizes this and will re-send the character to the MXE.

**QUESTION:** When transferring files from the Wang 2200 to the PC, the File Transfer Utilities will sometimes "hang", not always, and not always on the same file. Why does this happen?

**ANSWER:** Chances are, you are connected to a Wang MXE port. PC2200 recognizes this and uses the MXE Input Screen channel to accomplish the file transfer. This channel yields communication speeds that are twice as fast as the MXD. Also, the MXE uses XON/XOFF flow control that supplants the need for software driven control. The MXE also accepts full binary data so the transfer program does not have to send an extra byte of control information with each two bytes of data sent, like it does to the MXD. The result is much faster transfer rate than the MXD. Unfortunately, Wang has a bug in the MXE that will drop "Control Characters" periodically. Wang is aware of the problem. When PC2200 does not receive the MXE Control Character, it does not know how to handle the next byte of data received. In many cases, it will misinterpret the next byte as being a character to display to the screen. The result of this is "odd" characters being echoed on the screen to the right of the line "Sectors Transferred:". It can also cause a "lock-up" condition. If the problem occurs frequently enough to hamper transmission of files consistently, a modification can be made to PC2200FT to bypass MXE routines and treat the MXE as an MXD for transfer purposes. Note this modification will reduce speed of transfer by approximately one-half.

**PATCH:** Place a GOTO 1360 at the beginning of line # 1340.

**QUESTION:** What type of modems are required when using PC2200 from a remote PC to a host Wang 2200?

**ANSWER:** The most important thing to remember is that the PC (using PC2200) will be emulating a Wang 2236 terminal. You may wish to refer to Chapter 4 of either the WANG-2236DE or WANG-2236DW manuals. Generally speaking, the modems must be:

- Asynchronous

- Full Duplex
- Capable of the desired transmission speed (i.e., 1200 bps)
- Suitable for the type of phone line being used
- Set to a transmission speed compatible with the processor, or vice versa.
- The modem at both ends of the communication (remote and host) should be the same or compatible models set up the same way.
- **MOST IMPORTANTLY**, the modem **MUST** be capable of transmitting **AT LEAST 11 BITS PER CHARACTER** (i.e., 1 start bit, 8 data bits, 1 parity bit, and at least 1 stop bit)

Note that this last item rules out a majority of popular PC compatible modems such as the HAYES SMARTModems and their compatibles. These modems are only capable of transmitting a 10 bit word or character (usually 1 start bit, 8 data bits, and 1 stop bit). Modems that have been used successfully include the 11 Bit Racal-Vadic and Anderson-Jacobson modems.

**QUESTION:** When trying to use a laser printer which uses "soft fonts", particularly with TOM's Data3500 word processing, the printer just prints garbage. Is there any filter used by PC2200 that would disrupt the "soft fonts" that are downloaded to the laser printer?

**ANSWER:** The only "filtering" of the printer channel that PC2200 does is to watch for any occurrence of the 0Dh character -- the carriage return. Whenever PC2200 sees one, it inserts a 0Ah (line feed) character to allow PC style printers, which typically do not have the option AUTO LINE FEED set to ON, to be compatible with programs for Wang 2200 printers which DO typically have the option for AUTO LINE FEED set to ON. If the downloading of fonts has any 0Dh values (which is likely) then all bets are off on the success of the download. The data may be seen as garbage by the laser printer.

PC2200's Setup Menu, page 2, allows you to turn the "filtering" on or off.

**QUESTION:** Will PC2200 work with a plotter that is attached to LPT1: instead of a printer?

**ANSWER:** PC2200 will work with a plotter unless, within the stream of data characters, there is a 0Dh character imbedded. PC2200 would then insert an unwanted 0Ah character after the 0Dh. Refer to the previous question for a discussion of PC2200's handling of the 0Dh character. Again, PC2200's Setup Menu, page 2, allows you turn off the filtering.

**QUESTION:** When transferring files sequentially from a PC to a Wang 2200, using the Printer Re-direct [ HEX(2020..) format ] as found in the manual, I find that the last several bytes of one file gets put into the beginning of the next file transferred and not where it belonged. Why is this?

**ANSWER:** It has to do with the way the Wang 2200 system grants priority to output requests. A console request always takes priority over a printer request. What is happening is that while the data is transferring via the printer channel, the command to Close the file (which is a console output) comes through and is obeyed, interrupting the print process. When the next file is opened and the transfer begun, whatever was left in the printer buffer gets dumped into the new file first. The way to solve this problem is to introduce a timing structure of some sort, perhaps a FOR-NEXT loop, that will allow the first file to finish it's transfer before the file is closed.

**QUESTION:** Are there any limitations with using PC2200 transfer methods with either 360K or high density disks? Or with 5.25" versus 3.5" diskettes?

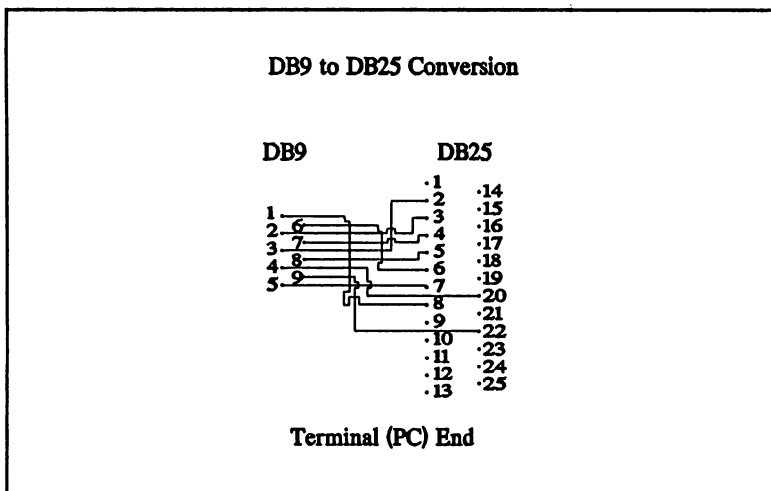
**ANSWER:** Keyboard File Transfer, Printer Redirect and File Transfer Utilities operations have no limitations with regard to low or high density, 5.25" or 3.5" diskettes.

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## Apendix F - Connector Pin Out Diagrams

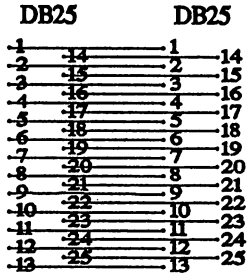
You may not need all the connectors shown here to complete the connection between a PC using PC2200 and a Wang 2200 system. If your PC does not have a 9-pin connector on the serial port, you won't need the DB9 to DB25 connector. We suggest that you use the standard Wang cable configuration and a gender changer for connection to a PC. This assures interchangeability among the Wang terminals and PC's using PC2200.

The arrows indicate the order of connection, starting from the PC end with the DB9 to DB25 connector (if needed).

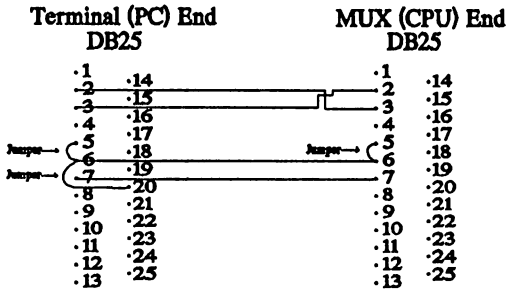




**Gender Changer  
Straight Through Pin to Pin**



**Wang 2200 Terminal Cable  
2236DE Cable**



**NOTE:**  
Solder Wire Shield to DB25 casing



# PRODUCT REPLACEMENT FORM

If your PC2200 diskette becomes lost or damaged, make a photocopy of this page, fill in the requested information, enclose \$25.00 for shipping and handling, and mail to:

Product Replacement  
Computer Concepts Corporation  
8375 Melrose Drive  
Lenexa, KS 66214

Disk:  3 1/2"  5 1/4"

\_\_\_\_\_  
Date

\_\_\_\_\_  
Name

\_\_\_\_\_  
Street Address

\_\_\_\_\_  
City

\_\_\_\_\_  
State

\_\_\_\_\_  
Zip Code

\_\_\_\_\_  
Telephone

\_\_\_\_\_  
Serial Number on diskette

\_\_\_\_\_  
Reason for Return

\_\_\_\_\_  
Signature

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8375 Melrose Drive, Lenexa, Kansas 66214

913-541-0900 • FAX # 913-541-0169